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ABSTRACT

This report, the sixth in a series of six, describes the evaluative activities carried out during Phase II of the California Educational Technology Assessment Program, and evaluates the partnership program between the California Department of Education (CDE) and seven software publishers. It is noted that this program was formed in 1986 in order to provide for the development of technology-based courseware to meet the instructional needs of California students in the areas of mathematics, science, and history/social science as identified by the Technology in the Curriculum (TIC) projects. The evaluation plan used for the software development included: (1) a review of existing records at the CDE and the developer locations; (2) project staff interviews; (3) self-assessment by the developers, which covered the areas of background information, planning, funding and support factors, marketing, and recommendations; and (4) a software user survey, which was given to at least 30 users of each of the products and elicited information on background, staff development, curriculum content and technology application, instructional features, and software product evaluation. Appendices contain copies of the self-assessment inventory form and the software user survey questionnaire. (AEF)

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Comprehensive Study of Educational Technology Programs Authorized from 1989-1992

Volume VI

Software Development Partnership Program

December 20, 1991

Submitted to:
California Department of Education
Office of Educational Technology
721 Capitol Mall, 3rd Floor
Sacramento, CA 95814

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Far West Laboratory for Educational Research and Development
730 Harrison Street, San Francisco, CA 94107-1242 (415) 565-3000

Comprehensive Study of Educational Technology Programs Authorized from 1989-1992

Volume VI

Software Development Partnership Program

Project Director
John Cradler

Project Consultants
James S. Eckenrod
Lynda Greene
Vicki Lambert

Data Analysis and Desktop Publishing
Dan Cradler
Kerrie Evans

December 20, 1991

Submitted to:
California Department of Education
Office of Educational Technology
721 Capitol Mall. 3rd. Floor
Sacramento, CA 95814

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Software Development Partnership Program

I. Background

Program Description. Between 1986 and 1988, the California Department of Education (CDE) awarded grants from Assembly Bill 803 funds to seven software publishers for business partnerships to develop technology-based programs to help meet instructional needs of California students. The matching grants were intended to provide "seed money" to encourage publishers to contribute investment capital in return for guidance from the CDE. The technology products were intended to address areas in the California Curriculum Frameworks that were lacking in high-quality software and to fill the "holes" that had been identified by the Technology in the Curriculum (TIC) projects. The products were also intended to be models for publishers/producers to stimulate the development of technology-based instructional materials that were aligned with the California Curriculum Frameworks. In addition, the CDE believes that the availability of quality technology-based instructional materials (i.e. aligned with the California Curriculum Frameworks) will encourage schools to purchase appropriate hardware. The products to be developed by this program of business partnerships were to be made available at a discount to California schools and the state would receive royalties on out-of-state sales.

Six projects were established in 1986 between the CDE and software publishers to produce instructional courseware in mathematics, science, and history-social science. Field tests of the programs were conducted in school districts by the software publishers in concert with CDE staff. Three of the original projects were subsequently cancelled and three were completed. The State is receiving royalties on the out-of state sales of the products.

A seventh project, *Science 2000*, was initiated in 1989, also with funds from AB 803, and was completed in 1991. The titles of the seven projects, the primary contractors (and collaborative partners), grade levels, and subject areas addressed were as follows:

Project Title	Publisher	Grade	Subject Area
GTV: A Geographic Perspective on American History	National Geographic Society (Apple Computer, Inc., and Lucasfilm Ltd.)	7-12	History-Social Science
Adventures in Mathland	Mindscape (Picodyne Corporation)	K-6	Mathematics
MECC World GeoGraph	MECC	6-12	History-Social Science
Explorations in Middle School Science	Jostens Learning Corporation	6-9	Science
Exploring Matter	C&C Software	9-12	Science
Science and Society Series	Advanced Ideas	9-12	Science
Science 2000	Decision Development Corporation (National Geographic, Dinamation Apple, IBM, and Pacific Bell)	7	Science

Legislative Authority. AB 803 authorized the Superintendent of Public Instruction to "contract for the research and development of educational software in accordance with priorities established to meet pupil needs."

Authorization for software development project support has been continued under the current legislation, AB 1470, the Farr-Morgan-Quackenbush Educational Technology Act of 1989. Section 51873.5 states that the duties of the Educational Technology Committee shall include "Advising the State Board of Education and the Superintendent of Public Instruction, pursuant to this article, on the allocation of grants for educational software research and development."

II. Planning and Restructuring

Program Planning. Each of the first six software development projects funded by the CDE was required to prepare plans for (1) designing a software product, (2) implementing the project, and (3) marketing and distributing the product. The request for proposals (RFP) for these projects, issued in 1986, provided broad guidelines for addressing curriculum content objectives, selecting technology applications, product testing, and technical specifications (CDE, 1986). The projects were given considerable latitude in proposing products to fill the "holes" in the curriculum.

In contrast, the RFP for *Science 2000*, set specific parameters for addressing topics from the middle school science curriculum, utilizing a variety of educational technologies, and product field testing with students representative of the diverse populations in the state.

Project Planning. The software development plans of the seven projects, particularly that of the contractor for *Science 2000*, drew upon the rationale for the program expressed in the RFPs for identifying the needs to be addressed by the projects, to formulate goals and objectives, for criteria to identify the members of curriculum and technology advisory groups, and to link marketing plans with other state educational improvement initiatives.

III. Program Description

Program Purpose. The rationale for the software development program expressed in the 1986 RFP observed that the holes in the curriculum existed "because software and video materials are expensive to develop and risks are high." It was noted further that:

> *"Sales and profits are difficult to predict; consequently content areas with the highest probability of return on investment are selected for development. Large, broad-scoped programs using advanced technology, such as interactive laserdisc, are risky due to large development costs and a small installed base of hardware.*
>
> *The State Department of Education intends to share in the risk of developing these software and video products by forming "partnerships" with publishers. In such a partnership, the State shares the development costs, in return for preferential pricing of products for California schools and/or royalties on sales. The State Department of Education will not develop the software, but will help to fund its development by publishers. The State will not own the software, but will negotiate rights to obtain copies for California schools and receive royalties to recoup its share of development costs. This investment of the State's is viewed as an "advance" against future royalties from the products, and a necessary strategy to bring to the marketplace products which are state-of-the-art, meet California's expectations for curriculum content, and which would not otherwise be readily selected for development by publishers."*

Rationale. The rationale in the second RFP, issued in 1988, was somewhat more direct in stating that the grant was "intended to provide 'seed money' to encourage the initial coordination and organization of materials and programs that better meet the needs of today's students and teachers. It is expected that the organizations joining in this effort will contribute a major portion of the investment capital, and, in return will receive guidance from the State Department of Education."

Project Objectives. Each of the seven software development projects proposed courseware that addressed curriculum topics and instructional objectives for specific grade levels or grade spans. The scope of planning for each of the projects is summarized in the following CDE descriptions:

> ***National Geographic Society**: Technology, Geography, and the State of California*, as originally proposed, was to be "an innovative software product which combines computer and optical technologies to provide dynamic tools for the teaching of a basic course on U.S. geography for students in grades 7-12. The partnership will draw heavily on the proprietary photographic resources of the National Geographic Society as well as the technical expertise of Apple Computer and Lucasfilm Ltd."
>
> "The National Geographic Society, in collaboration with Lucasfilm, will produce Level One laserdiscs in the CAV mode (which provides full random access to individual images as well as forward, backward, and multiple-speed play). The laserdiscs can be viewed as a linear, well-organized collection of segments. While these segments will be laid down for access by Apple IIGS, more complex machines, such as the Macintosh II, as well as less agile computers, such as the Apple IIe, also could access the laserdiscs."
>
> "The completed multimedia product will consist of images (still and motion), sound, and text stored on optical and computer discs. Production will begin in January 1988 with a projected completion in 1990." The state grant amounted to $500,000.
>
> ***Mindscape***: The product, *Adventures in Mathland*, was to be "a comprehensive blend of microcomputer software, guided print activities for using commonly available manipulative materials, and an optional interactive laserdisc designed to meet the needs of math education in grades K-6. It is designed to be a series of software products, all sharing a common theme: a child's adventures in a museum of mathematical discovery. The software will be produced both for the Apple II series and for MS-DOS machines. The entire product will be available October 1988." The original CDE grant to Mindscape was for $82,500.
>
> ***MECC***: As originally conceived by the Minnesota Educational Computing Consortium, *MECC World GeoGraph* was to be "designed as a social studies learning tool to foster knowledge acquisition in areas such as human geography, economics, political science, and demographics. This will be accomplished not through the mere presentation of facts and the rote memorization of figures but through direct student interaction with data."
>
> "The main strength of World GeoGraph is its role in the development of student study skills. Study skills in acquiring, organizing, and interpreting information will underlie its use. Intellectual skills in comparing attributes, classifying information, formulating questions, drawing conclusions, and testing hypotheses will be integral to the activities designed for it."
>
> "Students will use this tool to work with information pertaining to the United States as well as many other countries of the world. Students will be able to use maps to acquire facts and to test hypotheses and draw conclusions. The results of their inquiry will then

be graphically displayed, reinforcing not only which regions and countries fit certain criteria, but also where they are located relative to one another."

"The software will consist of maps and databases, and will be produced for the Apple IIGS machine. The product will be available April 1988." The CDE grant was for $100,000.

Education Systems Corporation (acquired by Jostens Learning Corporation): The proposal for Middle School Science described "a series of 36 computer-simulated laboratory activities for grades 6-9 keyed directly to what students are learning in the classroom." The activities were supposed to take students about 40 minutes to complete and complement "live" laboratory experience. Activities provide "simulated" laboratories in physical science where students could act like scientists applying science concepts. Each lesson was to have a similar structure:

Introduction--The introduction stimulates student curiosity and interest in the subject of the lesson via a brief "attention grabber." It also provides an overview of the lesson and assesses the student's prerequisite knowledge and skills.

Laboratory--A simulated laboratory is at the heart of each lesson. It may involve observing, measuring, collecting and analyzing data, hypothesizing, experimenting, predicting, or communicating results.

Quiz--A brief review and quiz follows each laboratory. Quizzes usually ask students to do something similar to what they have done in the laboratory.

The lessons were to run on a network-managed system of MS DOS or Apple IIGS microcomputers with 16 color, sound, mouse interface, and excellent graphic capabilities. It was estimated that the CDE contract award of $167,500 would cover approximately 30 percent of the development costs. The product was to be completed by March of 1989.

C&C Software: *Exploring Matter*, a science program for grades 9-12, was to be made up of a series of "activities designed in an interactive environment in which students explore the physical and chemical properties of matter." The activities were to be designed to guide student "study and exploration as they record observations, make measurements, and carry out investigations in either the actual physical science laboratory or in the simulated laboratory that is provided."

Designed for the Apple IIGS series of computers, the activities were to "give students an opportunity to study and explore science concepts and to learn basic laboratory techniques. The activities are selected and adapted to fit the capabilities of individual students. The programs automatically adjust to each student's skill level during operation, record scores and information about that students current level, and use and add to that information on subsequent runs." The product was to be available by December 31, 1988. The CDE grant for Exploring Matter was $80,000.

Advanced Ideas: *The Science and Society Series*, another science program for grades 9-12, was to consist of four educational computer programs designed for use in home or schools. A four disk series of programs was to "teach the principles of the scientific process and the social implications of those principles in an interactive adventure format. The theme of the series will deal with conservation issues and will feature colorful animated graphics, simple but powerful applications, and fast-paced writing."

"The products will incorporate databases, ecological models, and decision-making in a series of disks centered around the interactive conservation stories. The stories combine the scientific process with social decision making. The software program will make it possible for a teacher to efficiently deliver specific science curriculum materials."

Each disk in the two-disk software series was to present a story about an endangered species or resource. The person using the software was to be a participant in the story and play a pivotal role in deciding the outcome of various situations. The product was to be produced in MS-DOS and Apple versions by June of 1988.

***Decision Development Corporation**: Science 2000* was proposed to be a "complete technology-based learning resources management system for teaching science in grade 7." Decision Development Corporation established partnerships with Optical Data, Interactive Media, Inc., National Geographic Society, Dinamation, and Pacific Bell to develop the product "aligned with the new California Science [Curriculum] Framework and will demonstrate how a variety of technology-based materials (e.g., computer software, films, video and audio tapes, disks) can be configured to provide students the opportunity to experience an optimum science curriculum. The product will contain lesson plans which integrate the teaching of the earth, life, and physical sciences. The hypermedia tools will provide the teacher with access to a variety of resources for teaching the lesson. In addition to referenced resources, the program will include original materials on a laserdisc and in printed teacher guides."

Total monies authorized were $884,380 from fiscal year 1988-89 funds to Decision Development Corporation to create Science 2000. The product was to be completed in June of 1991.

IV. Program Implementation

Project Completion and Cancellation. As mentioned previously, four of the seven software development projects were completed and are now being marketed in schools in California and other parts of the country. For various reasons, summarized below, three of the original projects were not completed; these included:

Publisher	Product Title	Grant Award	Amount Paid
Mindscape	*Adventures in Mathland*	$ 82,500	$ 14,850

Reason Cancelled: The contract for the development of the product was cancelled by Mindscape in June of 1989, after two years of production when the principal subcontractor, Picodyne Corporation, suffered a financial failure and went out of business after providing only the first deliverable under the contract. Mindscape officials noted that they had already advanced Picodyne more money than they had received from the State of California.

CDE Position: The notice of contract cancellation from the officials at Mindscape was received with regret by the CDE. The Office of Educational Technology's acknowledgement of the notice of cancellation stated that "conceptually, Mathland had the promise of being an outstanding product" and expressed "hope that someday we may work together on another project."

Publisher	Product Title	Grant Award	Amount Paid
Advanced Ideas	*Science and Society Series*	$ 90,000	$ 41,480

Reason Cancelled: Advanced Ideas began work on the *Science and Society Series* during August of 1987 while final contract negotiations were being completed. On January 28, 1988, after extensive exchanges through correspondence and in meetings among staff of both the CDE and the contractor, about the quality of two sets of prototype materials that had been submitted for CDE review, officials of Advanced Ideas submitted a notice of cancellation. In a letter dated March 29, 1988, the Office of Educational Technology acknowledged receipt of Advanced Ideas' cancellation and issued the CDE's own notice of cancellation.

CDE Position: The CDE maintained that Advanced Ideas had not complied with the contract in completing the software product. Reviewers of *Science and Society Series* prototypes had considered the materials deficient in regard to grade level, program structure, curriculum focus, and production quality. In a letter dated February 3rd, in response to the notice of cancellation from Advanced Ideas, the Office of Educational Technology maintained that CDE staff comments had been timely and provided constructive criticism of the prototype product. In its cancellation notice, the CDE also demanded reimbursement of $20,740 of the funds that had already been advanced for the second production stage of the contract because the product was not satisfactory.

Contractor Position: In their contract cancellation notice, the officials of Advanced Ideas protested that the concerns expressed by the CDE about the content of the storyline of the prototype, the appropriateness of the product for the targeted grade level, the quality of the graphics, and the sequence of responses had not been provided in a timely manner. They also maintained that CDE staff had not followed through on commitments and that comments provided in earlier meetings had not been helpful in the revision of prototype materials.

Publisher	Product Title	Grant Award	Amount Paid
C&C Software	*Exploring Matter*	$ 80,000	$ 62,000

Reason Cancelled: The Office of Educational Technology issued a notice of cancellation by the CDE of the contract on April 4, 1989, citing unsatisfactory performance as the reason for the termination. The contract to C&C Software had been awarded on September 22, 1987, and the contractor worked for nearly 18 months while protracted correspondence was being exchanged over the quality of the experimental versions of the *Exploring Matter* materials and over payment for deliverables already made.

CDE Position: The CDE stated that the products submitted by C&C were not satisfactory and showed little promise of living up to expectations or of meeting the requirements of the California Science Framework. In January of 1989, the Office of Educational Technology had advised C&C that *Exploring Matter* materials submitted in December of 1988 were not satisfactory and that the CDE would not approve of any further contract payments until the contractor had made dramatic improvements in the product. Unfavorable recommendations from the manager of the CDE science curriculum unit and an independent evaluator had previously been cited as reasons behind the judgment that the product would probably

never live up to CDE expectations. In March of 1989, the CDE advised C&C that the contract was to be cancelled because: (1) "the software is not what we would deem software of quality," (2) "the software lacks pedagogy of quality and is not technically sophisticated," (3) "the software presentation is a trivialization of the concepts being presented," and (4) "the software is not a product we want to distribute to California schools as representative of the California Science Framework."

Contractor Position: Officials at C&C Software insisted that until January 28, 1989, they had believed that the project had been proceeding satisfactorily in accordance with a revised schedule agreed upon with the CDE in the summer of 1988. The company disputed CDE statements about corrections to flaws in the software and the provision of suggestions to improve the quality of the science content in the materials. The president of C&C argued that "communication from your end had been so poor that it could not possibly have made a positive contribution, and that we saw the problems that then existed with the project as largely the result of your attempts to guide."

The canceled projects were the three smallest, accounting for only about six percent of the total CDE expenditures.

V. Resources to Support the Projects

Support Factors. In addition to the AB 803 grants from the CDE, two of the software projects that completed their contracts were able to draw upon the resources of "high-powered" partners in the software development industry. The National Geographic Society was both the prime contractor for one project (*GTV: A Geographic Perspective on American History*) and a partner in another (*Science 2000*). *GTV* also benefited from the resources of Apple Computer and Lucasfilm Ltd. The Decision Development Corporation was able to draw upon the considerable creative and financial resources of Dinamation, Pacific Bell, IBM Corporation, Apple Computer, Inc., and Pacific Bell in addition to National Geographic in developing *Science 2000*.

Explorations in Middle School Science: The Physical Science Program was initiated by Education Systems Corporation, a developer of large scale computer assisted instructional programs. This company was later acquired by Josten's Learning Corporation.

The *MECC World GeoGraph* development project was completed by the Minnesota Educational Computing Consortium without assistance from any other firms. MECC, however, is widely recognized as one of the most experienced, wide-ranging educational software publishing houses with highly professional staff resources and fairly low internal operating costs that resulted in a very cost-efficient project and negated the need for outside development assistance or investment.

Adequacy of Resources. In each case the CDE grants provided the margin of support that was required to stimulate the development of the four software products that otherwise would never have gotten beyond the "wish list" category of instructional materials development. While each of the software publishers had sufficient resources to develop the products, all reported that market conditions would have kept them from risking the capital to do so without the state's subsidy.

VI. Program Support, Resources and Constraints

1. ***Budget.*** Separate budgets were negotiated for each of the software development projects. The amounts provided by the CDE and the partnership firms were as follows:

Publisher	Provided by CDE Grant	Publisher's Investment	Total
National Geographic Society	$ 500,000	$ 1,210,000	$ 1,710,000
Mindscape	14,850	Unknown	Unknown
MECC	100,000	190,100	290,100
Josten's Learning Corp.	167,500	332,500	500,000
C&C Software	62,000	154,100	216,100
Advanced Ideas	41,480	Unknown	Unknown
Decision Development Corp.	884,380	538,347	1,423,107
Totals	$ 1,770,210	$ 2,425,047	$ 4,139,307

2. ***Cost Benefits.*** As a partnership venture, the software development program was initially conceived to be cost effective: the CDE hoped that it would get a good return on its investment in terms of technology-based instructional materials to meet important curriculum needs and the business firms publishing the products would get a fair return on their investments from profits on sales in both the California and other educational markets. The state expects to receive royalties on the out of state sales of the products. Most if not all, of the states investment in the completed programs is expected to be returned by 1996. The cost-benefit analysis in Phase III of this study specifically addresses this question.

3. ***Leveraging and Institutionalization.*** It is clear that the CDE was able to stimulate or "leverage" more than was originally expended in the program. Well over two million dollars was leveraged by the state's investment of just over one and three-quarters million dollars.

Evaluation Plan for 1989 -1992

Software Development: The original proposal was expanded to amplify evaluation of the software development projects. CETAP has obtained assistance from a senior marketing consultant from Regis-McKenna Inc., a marketing research company that specializes in the assessment of software products. The following summarizes the evaluation used plan for software development:

Review of Existing Records: An extensive search of existing information located at the CDE and at the developer locations was completed.

Project Staff Interviews: Telephone interviews with available developers of software products were conducted to determine answers to questions not fully addressed by the Self-Assessment and to solicit additional information.

Self-Assessment by Developers: The CETAP staff developed a Software Development Project Self-Assessment Inventory that was completed by three of the four completed projects and by one of the terminated projects. This instrument asks a wide range of questions in the following categories: *background information, planning, content, product development, evaluation plan, project outcomes, funding and support factors, marketing, and recommendations.*

Software User Survey: The CETAP staff developed a survey distributed to educators who have and/or are using the software produced by the Software Development Projects. This instrument asks a wide range of questions. Items for this survey include: *background, staff development, curriculum content and technology applications, instructional features, and software product evaluation.* This survey was administered to a sample of at least 30 users of each of the products at beta and non-beta sites. It was completed by 33 users across all projects. **Due to the low rate of return, data derived from this survey should not be considered conclusive.** One of the products had only recently been completed, and another was still under development at the time of this study. Thus, developers were only able to supply the CETAP project with a few names of users.

On the next page is a matrix which list each of the instruments as Data Sources and shows the level of emphasis each instrument focuses on for each of the planned evaluation questions for the Software Development Projects.

Instrumentation Matrix:
Software Development

● = Primary Emphasis
◎ = Secondary Emphasis
○ = Little or None

To What Extent...	Data Sources				
	Self-Assessment Inventories	Interview Protocol	Teacher Surveys	Project Proposals/Plans	Project Evaluation Reports
1. Were the program outcomes attained? ★	●	●	◎	◎	●
2. Were major activities implemented as planned? ★	●	●	○	◎	○
3. Did the project support the state curriculum frameworks?	●	●	●	●	●
4. Was staff development that supported implementation provided? ★	◎	◎	●	◎	●
5. Was project developed coordinated with other programs? ★	●	●	◎	◎	○
6. Did student performance (academic and affective) improve?	◎	◎	◎	○	●
7. Were there desired changes in instructional practices (teacher perf.)?	◎	◎	●	○	○
8. Was implementation restricted and why?	◎	◎	○	●	○
9. Was implementation supported or facilitated and why? ★	◎	◎	○	●	◎
10. Was there dissemination of knowledge and/or products?	◎	◎	◎	◎	◎
11. Were unanticipated outcomes assessed? ★	◎	●	◎	◎	◎
12. Was there equal access for students, teachers, and administrators?	◎	◎	●	◎	◎
13. Did the project assist other schools to implement technology? ★	◎	◎	◎	○	◎
14. Did new business and higher education partnerships result?	●	●	○	○	●
15. Did the program implement the CDE goals and initiatives?	●	●	○	○	◎
16. Do teachers and administrators value the program(s)?	○	◎	●	○	●
17. Can the program be evaluated and show cost benefits?	◎	◎	◎	○	●
18. Should the projects be continued,discontinued, or expanded? ★	●	●	○	○	●
19. Was assistance provided by the CDE? ★	●	●	○	●	●
20. Should the state continue to fund software development? ★	●	●	●	◎	●
21. Have there been educational benefits from software development?★	◎	●	◎	○	●
22. Have lessons been learned that could improve future projects?★	●	●	●	◎	●

★ Added to questions required by the RFP

Software Development Project Findings

The following pages summarize the information reported by the developers of the software projects and the findings of the user surveys collected for each project.

National Geographic Society GTV: A Geographic Perspective on American History

I. Background Information

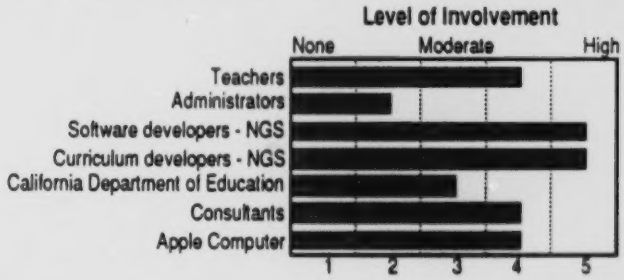
GTV is a presentation tool, a large database to be used as a research tool, and a multimedia word-and-image processor, designed to be used throughout the year as a supplement to the textbook. A standard pattern of GTV usage is that the teacher introduces a lesson to the whole class with one or two video features. Students then follow up each lesson with activities by the teacher, using computers if and when appropriate. At this point, GTV becomes a workstation in the back of the room where small groups of students may research a topic, write their own captions to images, and prepare their own shows. An opening GTV lesson can easily fit within the standard 45-minute period; follow-up activities vary in length of time depending on the extent of the assignment the teacher selects.

The National Geographic Society (NGS) of Washington, D.C. submitted *GTV: A Geographic Perspective on American History* as one of several software development partnership projects funded by the CDE and the Legislature between 1987 and 1990.

II. Planning

This project was initiated by Apple Computer, NGS, the CDE and a variety of educators who were included in project planning. Figure 1 shows the level of involvement of various parties in the planning process. The primary planners were curriculum developers and software developers.

Figure 1: Level of Involvement of Various Parties in Planning Process



An advisory committee was established for this project which consisted of seven educators, four media consultants, and a psychologist and which met for two full days in order to provide major input into the conceptual design of the product. Individual members of the committee provided follow-up consulting in their areas of expertise, with core educational and content reviewers reviewing outlines, scripts and rough cuts for each of the four laserdisc sides.

The NGS staff involved in this project consisted of a director, an executive producer, a manager of educational research and development, an editor and an associate editor. Lucasfilm Learning contributed an executive producer and a senior programmer. Apple Multimedia Lab supplied a director and the University of Maryland provided a history and geography consultant.

III. Project Plan

The project objectives were reported to have been accomplished and activities were completed as planned. A major change was in the decision to teach a combination of history and geography instead of geography alone, as was originally planned. This modification better reflected the reality of the middle school curriculum as well as the California framework, and allowed the product to serve a wider audience.

IV. Content

A. Curriculum Content

History-social science, problem-solving and study skills were the major curriculum areas targeted by *GTV*. In designing the software, which was intended to serve grades 5 through 12, several curriculum resources were consulted: *Model Curriculum Standards, Grades 9-12; Model Curriculum Standards, Grades K-8; Technology in the Curriculum Resource Guides*; and other state curriculum guides and key textbooks. *The History-Social Science Curriculum Framework, 1988* (draft and final version), was the California framework consulted.

GTV was designed to provide an introduction and overview to content covered in detail in the textbooks. Subject matter ranged from pre-Columbian times to the present. In tailoring the program to the California Framework, the three mandates which were followed most closely were: Relating History and Geography; Linking Past to Present; and Building Thinking Skills, Study Skills, and Participation Skills.

Potentially, this product could be used to stimulate and increase students' attention and interest, to expand instruction beyond what can normally be provided with textbooks, to introduce and/or conclude a lesson, to provide added activities to the existing lesson and to provide extended practice or related activities to the existing lesson. The program is appropriate for use by individual students, small groups of two to five students, or entire classrooms.

B. Staff Development

A teacher should be familiar with very basic computer operations in order to use this software, with proficiency in using the program requiring at least a half a day of self-guided practice. There is a "user friendly" teachers' guide and hotline support available, but no training specialist, since it was believed that more than anything, teachers need time to work on their own to integrate the program into their own curriculum. Also, there are several product demonstration resources available to teachers: California Technology Project regional consortia, Model Technology Schools, California History-Social Science sites, as well as many key districts and California's two Geography Alliances.

The company provided staff development funding for teacher training . Fee-based training is available through Optical Data Corporation, the sales distributor. The National Geographic Society has exceeded the $300,000 teacher training commitment outlined in the four-year *GTV* contract with the State of California. As stipulated in the contract, the Society donated more than $100,000 annually prior to the publication of *GTV* towards activities to improve geographic

education. In the two years following the publication of *GTV*, the Society has donated more than $50,000 annually towards *GTV* training in California.

C. Documentation

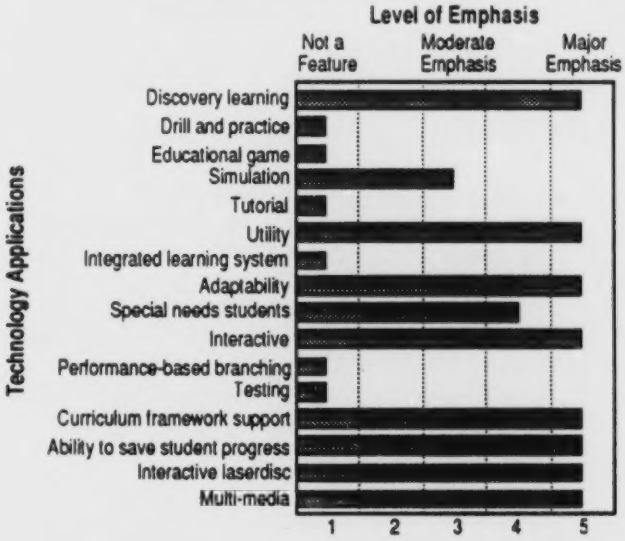
GTV consists of several teaching tools. There are two double-sided laserdiscs. One consists of 60 shows including video features, American Journals, and Population Clocks. The second consists of 1600 still images so that students and teachers can make their own shows. (There is computer software which lets the user: *Play Their Own Shows; Search for Images by Keyword; Read Their Own Captions; Write Their Own Captions;* and *Make Their Own Shows.)* Finally, there are two print reference materials: *Physical Map of the United States;* and *America on Parade – a timeline of U.S. History.*

The teacher's guide includes: Directions on how to hook up the TV, laserdisc player, and computer; Tongue-in-cheek step-by-step tour of the computer software; Troubleshooting section; Computer basics review; and Quick reference to all computer software features. The Guide also includes curriculum specific materials in its description of the scope and sequence of all video features. Also, background information and synopses of each show, and follow-up activities to do with and without the computer are provided. The Macintosh and IBM versions provide Help features.

D. Product Features

The table below indicates the degree to which each of the features listed is emphasized in the product, as stated by NGS on the Self-Assessment Inventory.

Figure 2: Features of Product



Following are some of the main features of GTV according to the National Geographic Society:

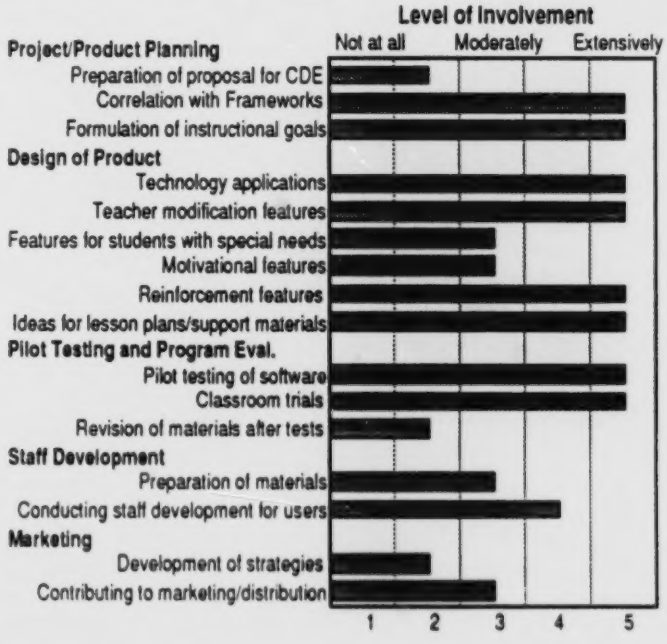
- Discovery learning is implemented through the video features which introduce or review a subject. They demand, by their nature, a student response. Their content is often point of view, with which students will identify, research the facts and then draw their own conclusions.

- Utility is provided through a built-in database, keyword search, word processor, and video editor for making and customizing shows.
- Adaptability is ensured because the program can be implemented with or without a computer. The teacher is able to choose shows or activities, and can even make shows.
- Special needs are addressed through the program's demonstrable success with the at-risk student. Attention is given to motivation, visual learning, brief captions and flexibility.
- Interactivity is promoted through the interactive tool, database, and image-and-word processor.
- The program was written specifically to *The History-Social Science Framework*.
- Ability to gauge student progress is implemented because users can save both shows and their location in the sequence of the program.
- The program is a multi-media product, i.e., it consists of two double-sided laserdiscs, computer software, teacher's guide, and cable to link computer and laserdisc.
- An Apple IIGS, Macintosh or IBM computer is suggested for use with this software, along with keyboard, mouse and monitor. A TV monitor and a laserdisc player are required, however.
- No other software packages are needed for use with this product.

V. Product Development

According to the developer, teachers were involved extensively in most phases of product development (Figure 3).

Figure 3: Involvement of Teachers in Product Development



Once the National Geographic Society and its consultants and Lucasfilm had a good outline of the project, a proposal was sent to the CDE. The CDE evaluated each rough cut and made suggestions for changes. The CDE also evaluated the Teacher's Guide outline and drafts and helped announce the project's availability. AB 1470 grants helped certain individual schools purchase *GTV*. The CDE continues to provide support for the product, offering recommendations for demonstration sites and uses of teacher training funding and other product-related suggestions.

VI. Evaluation Plan (Beta Testing)

Two hundred and fifty contacts including twenty-five teachers from nine school districts were used to determine need and feasibility for the program.

The formative evaluation during laserdisc development included approximately three hundred students from eight school districts, and twenty-five teachers. Students and teachers were shown rough cuts and asked to rate the shows according to their appeal and their appropriateness to educational objectives. Suggestions were taken on the kinds of follow-up activities and materials preferred.

Formative evaluation during computer software development included approximately four hundred and twenty-five students in five school districts, and four instructional design reviewers and classroom observers. The instructional design review was achieved by spot testing the functional software "shell" in classrooms. The first pilot test was a month-long alpha trial of the Table of Contents Module including the software, "check" laserdisc and a few printed directions. The second pilot test was of the Beta Table of Contents Module and the Alpha Showmaker Module including multimedia editor, slide database, word processor, "check" laserdisc, and a few printed directions.

Seventeen classrooms averaging twenty-five students each were used in final field testing. Approximately one hundred and twenty-five of the students were 7th graders, and three hundred of them were eighth graders. Approximately thirty students fall into each of the following categories: bilingual, special education, urban, and gifted. Three hundred and ninety-five could be considered suburban. The out of state school districts involved included Montgomery County, MD and Fairfax County, VA. The California districts included Cupertino, San Francisco Unified, and Marin County. Field test sites were selected to ensure a wide range of social, cultural, economic and intellectual factors in the student, and a low level of technological expertise on the part of the teachers. Proximity to either Lucasfilm or the National Geographic Society to allow visitation was also taken into account.

For final field testing, evaluators observed teachers working with *GTV* in a planning period, using the product in class, and training other teachers to use it. The evaluators also questioned teachers informally during their visits to the schools and probed their answers to a questionnaire as a kind of structured interview at the end of the test period. Much information was obtained, as well, through initial instruction of the teachers in using the software and accompanying equipment.

VII. Project Outcomes

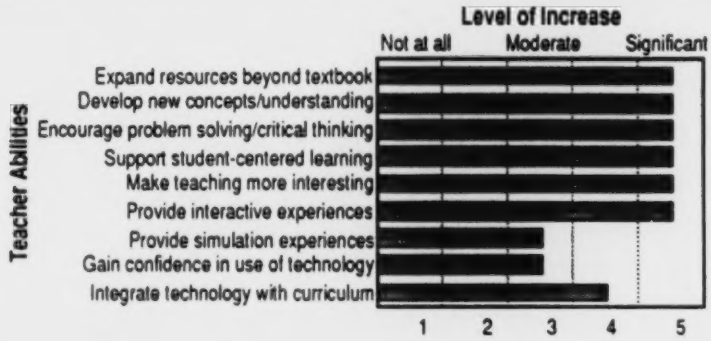
In general, the software was found to be easy to use and to have high appeal to students and teachers. Despite a typically low level of familiarity with technology, teachers were able to learn to use the program quickly although some adjustments were called for. The most significant hurdle may be the equipment itself. It is often necessary to purchase special cables or

adapters to connect the laserdisc player to the present array of monitors or TVs in the school. Problems encountered in obtaining these cables, which cost under $40.00 each, are less a matter of money than the purchasing process at the schools. Except for a laserdisc player lent by Pioneer, all necessary hardware was lent to the schools by the project.

The overall appeal of the product to teachers lay in its ease of use and in the content of the longer segments. In contrast, the shorter segments were viewed as lacking enough detail to substitute for a lesson, and there was some concern about the high cost of the technology in relation to its information yield, a perception which was not tested after the addition of the database and the Presentation Editor modules. Students were attracted to the technology itself. Opinions varied on the length of segments, music, narrators. Black-and-white images received low marks, and students preferred the moving images to the stills.

According to the developer, *GTV* specifically helped students learn traditional material in a vivid new form by practicing reading and writing within the context of "making television." Teachers were provided with a program which can be customized to their own particular needs, consisting of software and laserdiscs.

Figure 4: Increases in Teacher Abilities Brought About by *GTV*



There were systematic efforts to determine the cost-benefits of the software development project in comparison with conventional school textbook development programs. However, *GTV* is intended to illuminate, not cover, textbook material. The cost for a class of thirty-five would be about $28 per student which is equivalent to the cost of a textbook before volume discounting.

Among the unanticipated outcomes of the project was the discovery of the importance of high-quality production values to the students. Also unexpected was the enthusiasm with which "at risk" students greeted this supplement to reading and writing. These students showed increased motivation, interest, and self-esteem.

GTV will be upgraded to make the product compatible with computer operating system changes.

VIII. User Survey Results

A. General Information

Fifty-seven surveys were sent to a variety of educators using a mailing list provided by National Geographic. Fourteen (25%) of the surveys were returned by educators from a variety of settings, ranging from rural to urban, and small to large schools. Five were teachers (including one special education teacher and one department chair), four were coordinators or directors of special projects, one was a principal, one a vice principal, and one a computer lab technician.

Twenty-one percent of the educators were at schools which had received AB 1470 School-Based Educational Technology Grants.

All respondents stated that GTV was used in teaching U.S. History or social science. Students in all grades from kindergarten to adult were using the product at the sites surveyed, but the greatest concentration was in 8th grade.

A majority of the respondents (71%) were aware that the development of GTV was funded in part by the CDE.

Advertisements (43%) and professional conferences (36%) were the most commonly cited sources of initial information about GTV. Educators also learned about the product from sales representatives, county office media/technology consultants, listings in technology newsletters (such as Computer-Using Educators, CUE), and a variety of other sources.

More than one-third of the educators stated that a special project funding source had purchased GTV.

Most respondents (86%) decided to try GTV because it related to a curriculum need of the students. Many also cited looking for ways to increase student interest (79%), a desire to use technology programs in class (64%), student desire for technology programs (64%), students getting more out of technology programs (64%), and promotional information that made the program sound very effective (64%). Half of the educators were seeking ways to improve instruction in history-social science and many (43%) had heard from others that the program facilitated student understanding of social science concepts.

B. Staff Development

Half of the respondents reported that prior computer use was necessary to use GTV. Just over half (57%) stated that they had received staff development in the use of the product. This training was most often conducted by the California Technology Project Regional Consortia (38%), National Geographic staff (38%), school site staff (38%), and district staff (38%). CUE and outside consultants also provided staff development on GTV. Half of the educators receiving staff development indicated it was adequate.

Those reporting adequate staff development described it as a brief overview of the prepackaged teaching modules with use of the laser disk player and teacher's guide, a brief explanation of customizing lessons, and a brief hands-on session with the materials.

Those who reported that staff development was inadequate cited the brevity of the presentation and insufficient step-by-step instructions in the use of the product. When asked what staff development they thought was necessary to use GTV, teachers suggested a demonstration of product capabilities, hands-on time, step-by-step development of a lesson, demonstrations of model lessons, and tutoring with customized lesson development. Two teachers suggested including a tutorial or demonstration program.

Close to half (42%) of the respondents stated that extensive hands-on training was essential for teachers to effectively integrate GTV into the instructional program. Knowledge of the frameworks (21%), cooperative learning training (21%), and hardware in the classroom (14%) were also cited as essential for effective integration of GTV into the instructional program.

C. Curriculum Content and Technology Applications

A variety of U.S. History topics in the framework were listed by respondents as being covered by GTV. Among the specific history topics listed were: Pre-Columbian Days to Revolution, Independence to Civil War, Centennial to Twentieth Century, and World War I to Present. Overall, the US History topics received an average rating of 3.6 on a scale of one to five for adequacy of coverage. US Geography was also listed by several respondents; it received an average rating of 3.8.

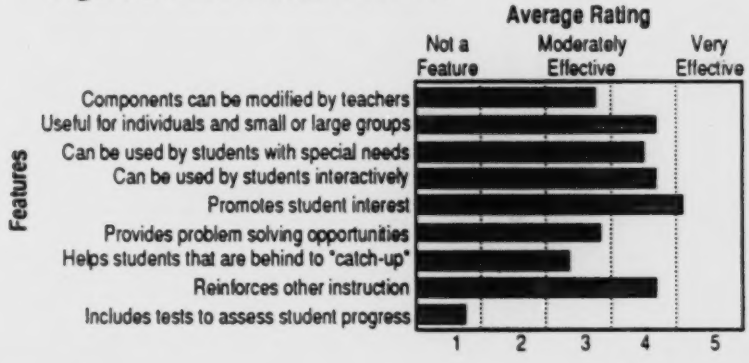
Three of the teachers (21%) have the computer and laserdisc player required to use GTV in their classroom. Most (86%) have equipment at their schools that teachers can share. Only one stated that their school could not afford the equipment needed to use GTV. About two-thirds reported that the required equipment is easy for teachers to use.

Eight respondents (57%) felt that HyperCard or other multimedia products could be used to increase the effectiveness of GTV.

D. Instructional Features

As shown in Figure 5, GTV was reported by users to be very effective in promoting student interest. The program was also found to be flexible enough to be used with small or large groups and students with special needs. Its interactivity and ability to reinforce other instruction were also highly rated.

Figure 5. Instructional Features



E. Software Product Evaluation

All of the educators stated that they use GTV as a classroom presentation tool. Most also use it for students in small group settings (79%) and with individual students (71%). Thirty-five percent use it with large groups of students.

Most respondents (64%) have used less than half of the entire curriculum package. Twenty-nine percent have used more than half but less than 80 percent of GTV.

Two respondents use GTV on a weekly basis. Both use it twice per week. Eight of the educators surveyed use GTV on a monthly basis, with an average of 3.8 uses per month. An average of 3.2 teachers use the program at each site surveyed. Most GTV users surveyed teach history-social science (86%) but a few teach English-language arts (14%).

The following figures show the average ratings given to various evaluation criteria. The evaluation criteria were based on those used by the California Instructional Video and California Computer Software Clearinghouses.

Figure 6. Effectiveness of Instructional Design

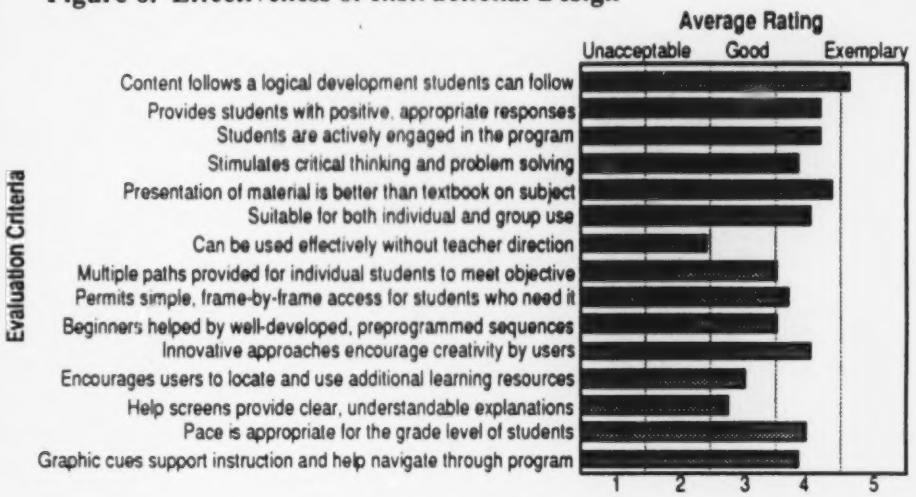

Average Rating
Unacceptable
Good
Exemplary
Evaluation Criteria
Content follows a logical development students can follow
Provides students with positive, appropriate responses
Students are actively engaged in the program
Stimulates critical thinking and problem solving
Presentation of material is better than textbook on subject
Suitable for both individual and group use
Can be used effectively without teacher direction
Multiple paths provided for individual students to meet objective
Permits simple, frame-by-frame access for students who need it
Beginners helped by well-developed, preprogrammed sequences
Innovative approaches encourage creativity by users
Encourages users to locate and use additional learning resources
Help screens provide clear, understandable explanations
Pace is appropriate for the grade level of students
Graphic cues support instruction and help navigate through program
1
2
3
4
5

Figure 7. Effectiveness of Interactive Features

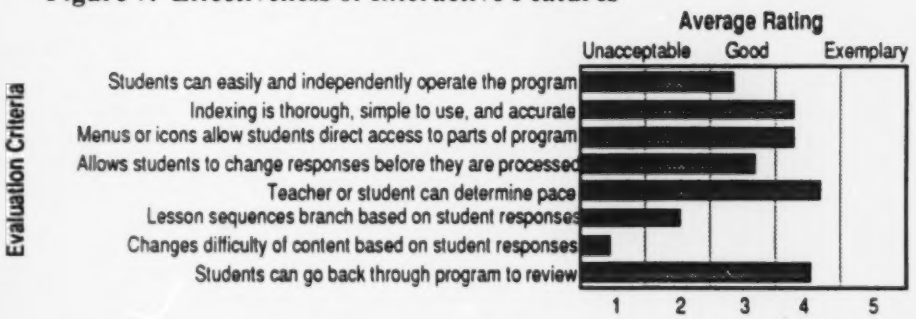

Average Rating
Unacceptable
Good
Exemplary
Evaluation Criteria
Students can easily and independently operate the program
Indexing is thorough, simple to use, and accurate
Menus or icons allow students direct access to parts of program
Allows students to change responses before they are processed
Teacher or student can determine pace
Lesson sequences branch based on student responses
Changes difficulty of content based on student responses
Students can go back through program to review
1
2
3
4
5

Figure 8. Support of Curriculum Frameworks

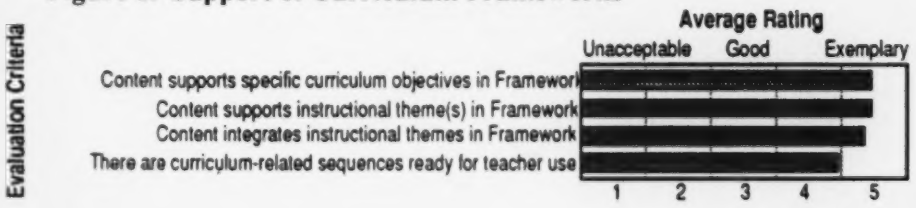
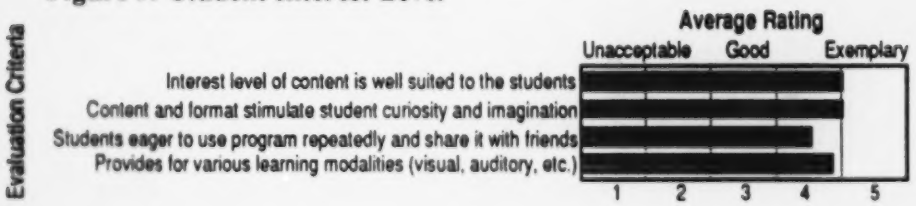


Figure 9. Student Interest Level



As shown in Figure 6, the most effective elements of GTV's instructional design were its logical development of concepts (which is easy for students to follow) and its ability to present material better than the history-social science textbook. The most highly rated interactive features were the program's pace can be set by the student or teacher and that students can go back through the program to review (see Figure 7). According to the educators surveyed, GTV was not able to change the difficulty of its content based on student responses. GTV's support of the *California Curriculum Framework for History-Social Science* was found to be exemplary by almost all of the educators surveyed (see Figure 8). As shown in Figure 9, high ratings were also given to the program's ability to stimulate student interest in history-social science. The average overall rating of the instructional value of GTV was 4.4 (between good and superior on a five point scale).

Only three respondents were aware of products similar to GTV. Two listed Optical Data Corporation science laserdiscs and one mentioned Hyperstudio combined with laserdiscs. Neither of these products specifically supports history-social science instruction.

There was no consensus among teachers as to wether GTV or traditional printed materials were more cost-effective. The prices that the schools or districts would be willing to pay for GTV ranged from $300 to $900, with the average being $579. In general, teachers reported the list price of $995 was too high. California schools were able to purchase the program for $650 until December 1, 1991.

F. User Comments

A teacher from Project TOPS (a Level II Academic-Technology Model Project) wrote in:

> *"We have highly recommended this program to teachers who have visited us. Students even demonstrated it at the National Education Association (NEA) conference in San Francisco last March."*

IX. Funding and Support Factors

A. Funding Support

Several organizations that contributed both direct payment and in-kind support were very important to the success of the project. Lucasfilm Learning provided video production, software design and programming services. Apple Computer was involved in early planning, funding, and software technical assistance. The CDE provided major funding as well as consultation on curriculum . The National Geographic Society Educational Program provided teacher training and public information. Also very important was the advance purchase of many units by Optical Data Corporation, which serves as the distributor. Of significant, though slightly less, importance was the in-kind support from IBM which provided technical advice and equipment support; the direct and indirect support from the National Geographic Society Educational Foundation, which provided fundraising; the direct payment of funds from Pacific Telesis and from Iowa Carver Trust for equipment and training; and the in-kind support of the San Francisco Schools which provided its early endorsement, test sites, and system-wide application of the program. In-kind support was also provided by the Pioneer Communications of America, Inc., the Kern County High School District, and the Iowa Department of Education.

The National Geographic Society contributed $1,210,000 to the original version of *GTV*. This investment, as well as the investments of its partners in the project was recovered because the company was able to write off certain prototype phases. It would not have been possible for the

National Geographic Society to have developed and produced this product without the $500,000 CDE Software Development Project Grant.

This grant and the National Geographic Society's original budget did not cover the cost of future computer versions beyond the IIGS version. Since then, there has been a Macintosh version developed with financial and in-kind assistance from Apple Computer and an IBM version developed with in-kind assistance from IBM. Although GTV has an outside distributor, the National Geographic Society incurs expenses in the hundreds of thousands of dollars each year in supporting and maintaining the product line. This was not part of the original budget or CDE grant.

B. Supporting and Impeding Factors

Funding Factors. The overall funding available for the project and the amount of funding provided by the CDE greatly supported its planning, implementation and outcomes. The schedule of CDE payments was also very helpful.

Product Development Factors. The establishment of working relationships with development partners and the performance of those partners were reported to be the two most important factors affecting the planning, implementation and outcomes of the project. Other important factors included the matching of the program's content with the California History-Social Science Framework for marketing purposes both within and outside of California, matching the technology applications to teachers' skills, and providing staff development materials for product users.

Evaluation and Monitoring Factors. Making design changes based on internal evaluation of the project, assessing the capabilities of teachers to use the program effectively, and field testing the software were the three factors believed to be most helpful to the development of the software. Of slightly less importance were making design changes based on external evaluations, and evaluating the effects of the product on student learning and attitudes. Clarifying content objectives and making design modifications at the request of the CDE project monitor helped the final product somewhat, although the ongoing interaction with the project monitor was reported to have slowed down product development to some extent.

X. Marketing

Optical Data Corporation of Warren, N.J. is the sole distributor of *GTV*. The company is a leading producer and distributor of laserdiscs, with a field staff of regional sales managers, a customer support service for ordering and information, a technical support hotline, and an inservice program for users of laserdiscs. Customers may either order or preview kits through this distributor.

Both NGS and Optical Data Corporation advertise and promote *GTV*. NGS sponsored the original direct mail brochure and produced three short informational videos – one is available free of charge to schools; two are for use in presentations. *GTV* is now offered in both the NGS's Educational Technology Catalog and in Optical Data Corporation's annual catalog and other product brochures. *GTV* is exhibited at most major educational conventions; *GTV* workshops are scheduled at many of them. Optical Data Corporation features *GTV* in its promotional newsletter to the schools. The product has attracted the attention of both TV and print media. *GTV* is marketed in California as it is elsewhere. California, however, has received the benefit of a four-year teacher training commitment as part of its contract with NGS, leading to greater product seeding in key demonstration sites, more teacher training workshops and ten half-day hands-on workshop/demonstrations.

The suggested retail price of *GTV* is currently $995.00. In its first year of publication, *GTV* was offered at a special introductory price of $650.00 (until 12/1/90). In place of a discount, California educators were provided with free staff development, valued at $300,000.

GTV sales have exceeded the expectations of the developer. It has just passed the break-even point on development costs. There is considerable cost involved, however, in maintaining the product line-- marketing, services, royalties, teacher training assistance. To date, California represents 29% of total sales units. The state has received $22,163 in royalties from the out of state sales of GTV.

XI. Use of Product by School-Based Grant Projects

Several of the AB 1470 School-Based Educational Technology Grant Projects used a portion of their funding to purchase *GTV*. In fact, *GTV* was the third most popular software product, used by 36 projects (14% of those surveyed). In general, it received high ratings for effectiveness averaging 4.3 on a 5 point scale. A teacher surveyed at one of these projects submitted the following description of a student who was helped by the product:

> *Guz joined our student population in March. He was an ESL student from East Los Angeles whose father was relocated to Northern California. A very shy boy, Guz was slow to integrate into our community, until he became involved in technology. Guz utilized the GTV laserdisc to produce a video segment about immigration.*
>
> *I did not have time to give him the instruction other students received earlier in the year. He asked to borrow the manuals and taught himself. His presentation was the best in the class. His esteem rose tremendously.*
>
> *I received a card from Guz at the end of the year in which he described this as the best year he ever had.*

GTV was also mentioned specifically by several students who were surveyed at School-Based Grant projects. These students found the program to be both useful and fun to work with.

MECC World GeoGraph

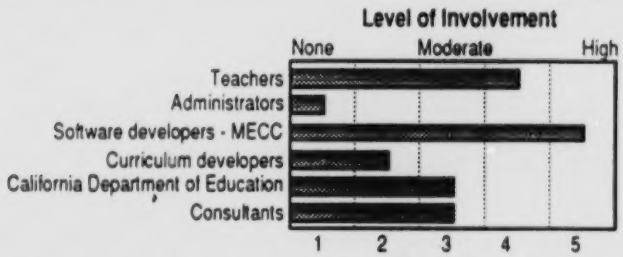
I. Background Information

The MECC Corporation of Minneapolis submitted World GeoGraph as one of several software development partnership projects funded by the CDE and the Legislature between 1987 and 1990.

II. Planning

This project was initiated by MECC and a variety of educators were included in project planning. Figure 1 shows the level of involvement of various parties in the planning process.

Figure 1: Level of Involvement of Various Parties in Planning Process



In order to evaluate the software, suggest support materials, and help review the project generally, an advisory committee was established which consisted of four professionals in education. Three of these taught at the college level and specialized either in teacher training or in geography. The fourth was a teacher of social studies in the Minnesota public school system.

The MECC employees most involved in the development of the project included two software designers, three programmers, and two graphic designers.

III. Project Plan

The project objectives were accomplished and activities were completed as planned. No major changes in the scope of work, timelines, etc. were negotiated before the projected was completed.

IV. Content

A. Curriculum Content

Geography and history-social science were the major curriculum areas targeted by MECC World GeoGraph. In designing the software, which was intended to serve grades six through adult, both state-adopted curriculum materials and the *History-Social Science Framework for California Public Schools, K-12, 1988*, were consulted.

The three topics of the California Framework which were covered thoroughly in the design of the software were geographic literacy, physical geography and world regional geography. Critical thinking skills, nationalism in the contemporary world, hemispheric relationships in the post war era, contemporary issues in the world today, and international economic concepts were given strong but slightly less emphasis, and cultural literacy was only lightly touched upon.

World GeoGraph is a discovery-learning product with a wide variety of uses in the classroom. Students can use it to freely explore a nation and/or topic in geography or to compare nations. It includes a wealth of demographic and economic information about nations and regions. Teachers can use it to illustrate or demonstrate geographic concepts, international trade, global political issues, macroeconomics, and demographics. It can be used with a high degree of teacher guidance or none at all. While its use by individual students is ideal, it can be used nearly as effectively by small or large groups also. Potentially, the program can be used to stimulate and increase students' attention and interest, to expand instruction beyond what can normally be provided with textbooks, to provide added activities to the existing lesson, and to provide extended practice or activity related to the existing lesson.

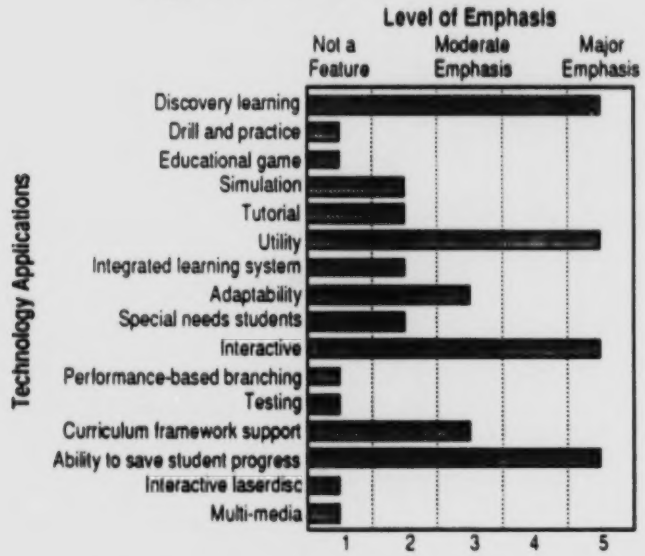
B. Staff Development

A teacher who is familiar with basic computer operations could become proficient in the use of this software in one or two hours without any special training. The World GeoGraph Classroom Guide and the World GeoGraph User's Guide provide all necessary instructional information.

C. Product Features

Figure 2 shows the level of emphasis given to the product's various features.

Figure 2: Features of Product



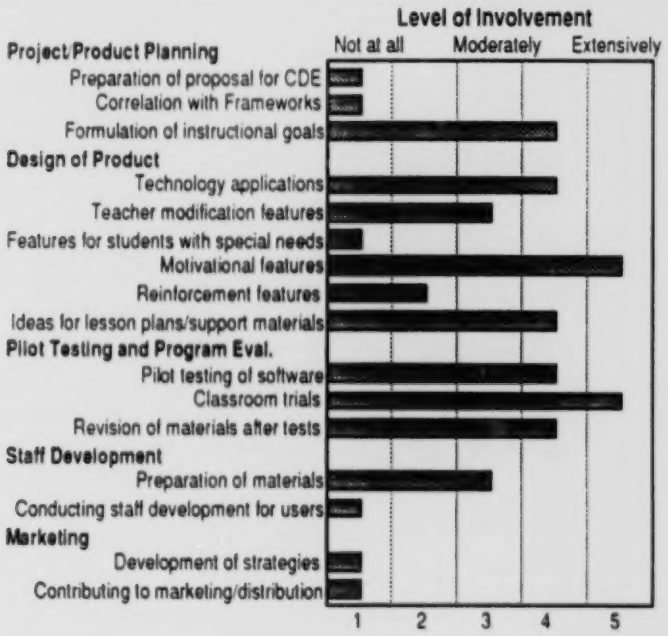
The most important features of the product were discovery learning, utility, and the ability to save student progress. The discovery learning feature provides a non-linear, open-ended tool that students can use to explore and analyze topics of their own choosing, allowing them to draw their own conclusions from the data. As a utility, the program serves as a "geography processor" or database and map-making tool that allows for printing and saving of reports. Students can save their work for later resumption or teacher examination.

This software requires the use of an Apple IIGS computer with at least 768K and any RGB color monitor. LCD panels and video projectors would be useful but not required. No other software packages or equipment are necessary to accompany World GeoGraph.

V. Product Development

As shown in Figure 3, teachers were involved in many phases of product development.

Figure 3: Involvement of Teachers in Product Development



VI. Evaluation Plan (Beta Testing)

Four classrooms in two different school districts were used to evaluate World GeoGraph in terms of clarity, appropriateness, ease of use, and usefulness, and to consider any changes that might be made to the program to improve it in these and other areas.

The evaluation began with the four teachers being consulted and shown how to use the product. The teachers then used the product with their students for four weeks. The product designers got input from the teachers during this period and observed the product being used in class and interviewed both students and teachers.

Surveys of both students and teachers were used in the quantitative evaluation process. Qualitatively, classroom observations, interviews with both teachers and students along with their incidental comments, and teacher assessments of students' work all contributed to the evaluation.

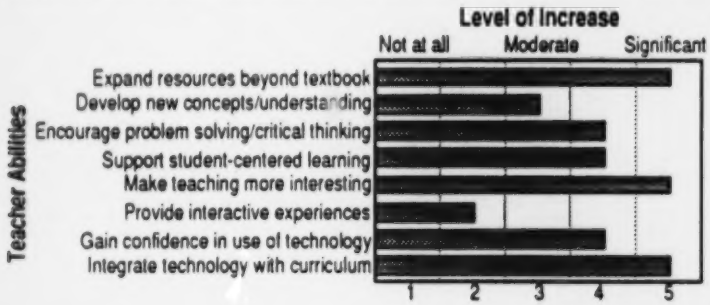
There were approximately twenty-five 6th graders and twenty-five 7th graders involved in the final classroom field test. The teachers had all necessary hardware in their classrooms, and the schools had all necessary hardware for teachers to share. MECC gave memory chips to some of the participating schools. There is little information on the field testing of this program since no report was prepared.

VII. Project Outcomes

MECC World GeoGraph specifically helped students learn to use a database as a tool for inquiry and analysis in geography, and to observe possible correlations among various types of data. They were better able to observe patterns of similarities and differences among nations and to understand basic geographic concepts of location, place, and relationships within places and regions.

Teachers were able to enhance classroom lectures by using the program as a tool to display maps, charts, and data. They were also able to create student handouts and examine geographic data in preparation for classroom activities. Figure 4 shows project staff's assessment of the product's impact on teaching ability.

Figure 4: Increases in Teacher Abilities Brought About by World GeoGraph



There were no systematic efforts to determine the cost-benefits of this software development project in comparison with conventional school textbook development programs, and there were no unanticipated outcomes of the project. While the program will have to be revised every two or three years, MECC plans to provide periodic data updates through information disks as long as the demand continues.

VIII. User Survey Findings

A. General Information

Using a list of users provided by MECC, thirty surveys were sent to a variety of educators using a list of users provided by MECC. Seven (23%) of the surveys were returned – four by California educators and three by educators in other states. Four were teachers (including one department chair), one was a director of computer instruction, and two were technology coordinators. One teacher was at a school which had received an AB 1470 School-Based Educational Technology Grant.

Two teachers used *World GeoGraph* to teach social studies, one used it for geography, one used it for both, and one used it to support mathematics instruction. The remaining two teachers did not actually use the product with students due to technical difficulties – one said it was too slow and too expensive to purchase a copy for each computer and the other didn't have enough memory for the program to run. The educators surveyed used *World GeoGraph* with middle or high school students ranging from grade six to twelve.

Advertisements (57%) were the most commonly cited source of initial information about *World GeoGraph*. Educators also learned about the product from listings in technology newsletters

(such as Computer-Using Educators), articles in professional journals, district curriculum coordinators, at conferences, and from fellow staff members.

Three educators stated that a teacher had purchased *World GeoGraph*. The other copies were purchased by a school district, a special project, a school, and a computer coordinator. The most common reasons for trying the program in class (cited by four respondents each) were: it related to a curriculum need of the students, the teacher likes using technology programs, and the students like using technology programs. Three stated they had heard that *World GeoGraph* helps students to understand geography and social science concepts. Other reasons listed were: students get more out of technology-assisted instruction, teachers look for ways to increase student interest, and that it was highly recommended by a colleague.

B. Staff Development

All of the respondents reported prior computer use was necessary to use *World GeoGraph*. One educator received staff development in the use of the program from staff at the school site and from MECC. This teacher stated that the staff development was not adequate because it was too brief and did not provide enough hands-on experience.

When asked what staff development they thought was necessary to use *World GeoGraph*, one stated that reading the manual was sufficient, two indicated basic knowledge of computer operation was necessary, and two reported in-depth hands-on training was needed for all aspects of the program.

Two teachers stated little or no additional training was needed to integrate the *World GeoGraph* into the instructional program. One stated sharing ideas with other teachers was important, one indicated training in the California Curriculum Frameworks was necessary, and another stated training in database operation was needed.

C. Curriculum Content and Technology Applications

Three specific topics were listed by educators as being covered by the program: world geography, world demographic data, and world social/economic data. Both teachers who listed world geography gave *World GeoGraph* a 5 on a scale of 1 to 5 for adequacy of coverage. The teacher who listed demographic and social/economic data gave these topics a 3.

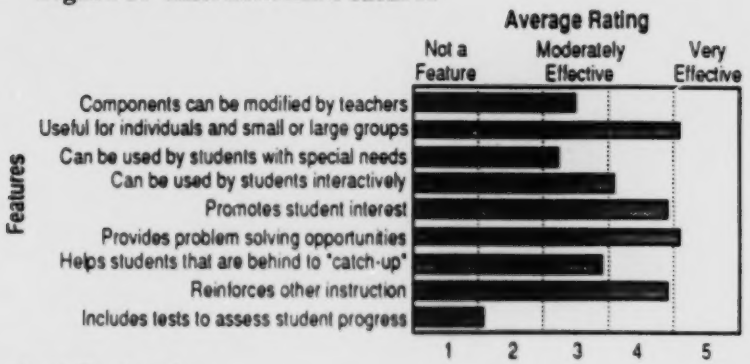
Most of the educators (71%) have the Apple IIGS needed to run *World GeoGraph* in their classrooms. The remaining teachers have access to shared equipment at their schools. Only one of the seven educators reported that the equipment was easy for most teachers to use.

Four of the respondents (57%) indicated word processing/desktop publishing software could be used with *World GeoGraph* to effectively promote learning. Three stated that multimedia software would be an effective complement to the program and another three stated that graphics software was very effective. Three also reported that database management software worked well to promote student learning. One teacher reported that database software was not effective with students.

D. Instructional Features

As shown in Figure 5 below, *World GeoGraph* was found to be very effective in providing student problem solving opportunities. The program was also found to be flexible enough to be used with small or large groups and students with special needs. Its ability to promote student interest and its reinforcement of other instruction were also highly rated.

Figure 5. Instructional Features



E. Software Product Evaluation

Most of the educators surveyed used *World GeoGraph* in more than one instructional setting. Usage was spread evenly between large groups, small groups, individual students, and teacher presentation.

A majority of the respondents (60%) have used more than half but less than 80 percent of the entire curriculum package. The remaining 40 percent have used less than half of the program.

Three respondents use the program on a weekly basis (between one and three uses per week). Two of the educators surveyed use *World GeoGraph* on a monthly basis. Both use it once per month. The other two educators do not use the program with students. An average of 1.6 teachers use the program at each site surveyed. Four respondents use *World GeoGraph* to teach history-social science and one uses it to teach math.

The following figures show the average ratings given to various evaluation criteria. The evaluation criteria were based on those used by the California Instructional Video and California Computer Software Clearinghouses.

Figure 6. Effectiveness of Instructional Design

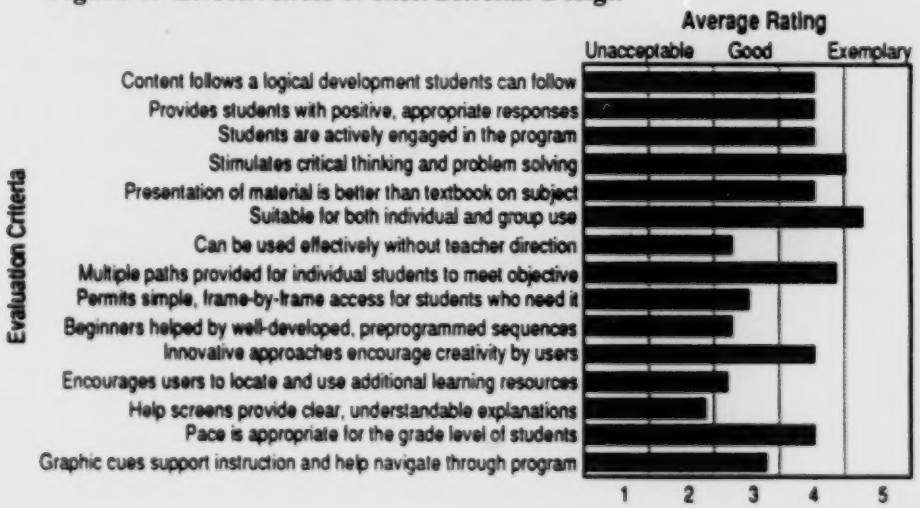

Average Rating
Unacceptable
Good
Exemplary
Evaluation Criteria
Content follows a logical development students can follow
Provides students with positive, appropriate responses
Students are actively engaged in the program
Stimulates critical thinking and problem solving
Presentation of material is better than textbook on subject
Suitable for both individual and group use
Can be used effectively without teacher direction
Multiple paths provided for individual students to meet objective
Permits simple, frame-by-frame access for students who need it
Beginners helped by well-developed, preprogrammed sequences
Innovative approaches encourage creativity by users
Encourages users to locate and use additional learning resources
Help screens provide clear, understandable explanations
Pace is appropriate for the grade level of students
Graphic cues support instruction and help navigate through program
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Figure 7. Effectiveness of Interactive Features

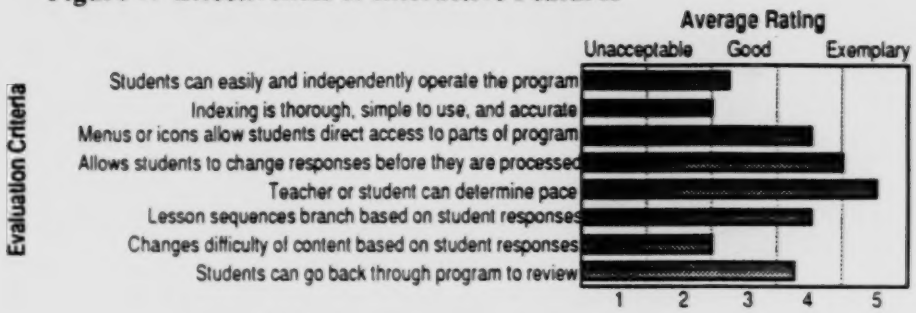
Average Rating
Unacceptable
Good
Exemplary
Evaluation Criteria
Students can easily and independently operate the program
Indexing is thorough, simple to use, and accurate
Menus or icons allow students direct access to parts of program
Allows students to change responses before they are processed
Teacher or student can determine pace
Lesson sequences branch based on student responses
Changes difficulty of content based on student responses
Students can go back through program to review
1
2
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Figure 8. Support of Curriculum Frameworks

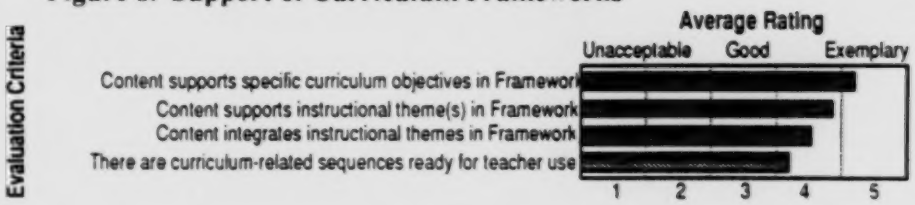
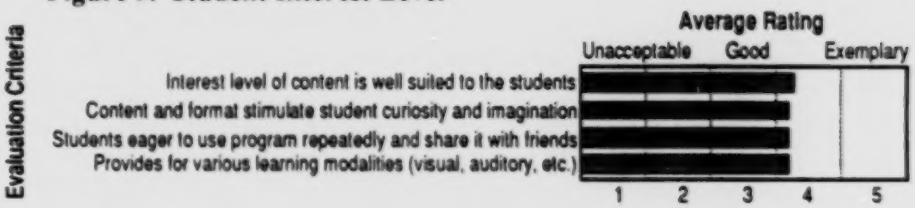


Figure 9. Student Interest Level



As shown in Figure 2, the most effective elements of *World GeoGraph's* instructional design were its ability to be used with small and large groups and its stimulation of critical thinking and problem solving skills. The most highly rated interactive features were that the program's pace can be set by the student or teacher and that students can change their responses before they are processed (see Figure 3). *World GeoGraph's* support of the *California History-Social Science Framework* was found to be good to exemplary by the educators from California (see Figure 4). As shown in Figure 5, good ratings were also given to the program's ability to stimulate student interest in history-social science. The average overall rating of the instructional value of *World GeoGraph* was 4.75 (between good and superior on a five point scale).

Three respondents were aware of products similar to *World GeoGraph*. All three mentioned PC-Globe, which is available for Macintosh and IBM-compatible computers rather than the Apple II GS. Also mentioned were Geo Quiz and MECC US GeoGraph, a follow-up product funded entirely by MECC.

F. User Comments

A high school math teacher stated that he successfully used *World GeoGraph* to illustrate the demographics of the Middle East to students during the Gulf War. He said the comparative data features of the program were excellent and helped the students to understand where the war was

and why it was being fought in addition to presenting the basic concepts of statistical analysis. His overall reaction to *World GeoGraph* was: *"Good job guys!"*

IX. Funding and Support Factors

A. Funding Support

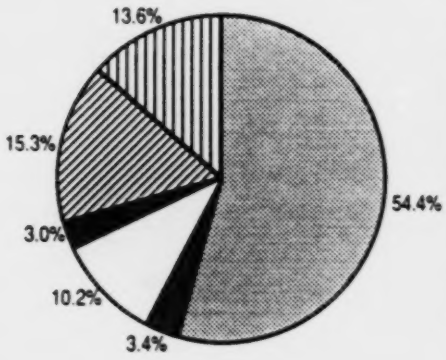
The in-kind staff time provided by the University of Minnesota, the University of San Francisco, and Bloomington Public Schools was of light-to-moderate importance. The direct payment of $100,000 in funds through the CDE's Software Development Project Grant was essential to the project.

MECC contributed $190,000 to the development of this software, an investment which it has succeeded in recovering under the present arrangement. If MECC were to develop and produce this software without state support, they estimated that at least $500,000 in sales would be necessary in order to justify the risk of developing this product, which has an estimated useful life of 4-5 years.

B. Project Expenditures

The total expenditures for MECC *World GeoGraph* were $290,000. All costs of the project were covered by the amounts invested by MECC and the CDE. Figure 10 gives a breakdown of the expenses of project development as reported on the Self-Assessment Inventory.

Figure 10: Project Expenditures



Expenditure	Amount
Professional staff	$160,000
Support staff	$10,000
Materials/supplies	$9,000
Contract services/ expenses	$45,000
Staff Benefits	$30,000
Technology hardware	$45,000
Total	$290,100

C. Supporting and Impeding Factors

Funding Factors. The overall funding available for the project greatly supported its planning, implementation and outcomes. The amount of funding provided by the CDE and the schedule of payments both also figured very strongly in supporting this project.

Product Development Factors. The development of staff training materials for product users was believed to be the single most important factor in developing MECC GeoGraph. Of slightly less importance were the interaction with the project's advisory group, the matching of technology applications to teachers' skills and the limitations of hardware in schools. Also of slightly less importance was the matching of content with the California Curriculum Frameworks for marketing within the state. Considerations for marketing outside of California in general, and correlating the software with curriculum in other states also were only slightly supportive.

Evaluation and Monitoring Factors. Making design changes based on internal evaluation of the project, and evaluating the effects of the software on student learning and attitudes were the two factors reported to be most helpful to the development of the software. Of slightly less importance were making design changes based on external evaluations, assessing capabilities of teachers to use the programs effectively, and field testing of the software.

X: Marketing

The product is being distributed through multiple channels, including directly from MECC, via educational and retail dealers, and through educational distributors. MECC's authorized representatives also sell *World GeoGraph*, including some in California. There are ads in educational journals and direct-mail brochures have been sent out. The product is also included in most educational computing catalogues.

According to MECC, the original suggested retail price was $139, including the Classroom Guide. The California school price was to be $89 when obtained directly from MECC at cost. The sales price has steadily declined and is presently $41.40 for California schools.

Sales are meeting expectations both within and outside of California. No exact sales figures broken down by state are available. From 6/90 to 3/91, the product has sold approximately 2,400 units (approximately $135,000). The projection for 1992 is approximately 2,500 units ($150,000). The product is now on the "down side" of the sales cycle. Sales in fiscal year 1990 were approximately 5,000 units ($300,000). Sales have been comparable or perhaps a little better than those of competing educational products.

To date, the state has received $30,904 in royalties from out of state sales of MECC World GeoGraph.

XI. Use of Product by School-Based Grant Projects

Five AB 1470 School-Based Educational Technology Grant Projects used a portion of their funding to purchase *World GeoGraph* . PC Globe, a competing product, was purchased by six projects. World GeoGraph's average rating for effectiveness was 4.0 on a five-point scale.

Sixth grade students, when asked about *World GeoGraph* at one project site, replied:

> *"It gives a choice. We can select what it is we want to explore." and "It helps me in learning; I can find out find out for myself the information, in the way I want to find it, without having to be programmed to do it in a certain way."*

Students were able to use the program to easily compare detailed demographic and economic data between different countries and to make predictions based on the comparisons.

Science 2000

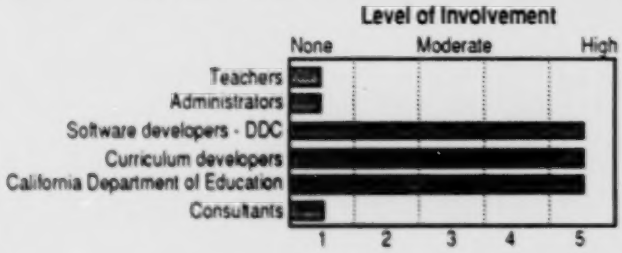
I. Background Information

The Decision Development Corporation of San Ramon, California submitted *Science 2000* as one of several software development partnership projects funded by the CDE and the Legislature between 1987 and 1990.

II. Planning

This project was initiated by the Decision Development Corporation and the CDE. Figure 1 shows the level of involvement of various parties in the planning process.

Figure 1: Level of Involvement of Various Parties in Planning Process



In order to evaluate the software, suggest support materials, and help review the project generally, an advisory committee was established by the CDE which consisted of seven professionals in education and two corporate advisors.

III. Project Plan

The project objectives were accomplished and activities were completed as planned. The software and the curriculum were both revised and expanded in scope.

IV. Content

A. Curriculum Content

Among the curriculum resources consulted in the design of the software, which was targeted for use by 7th graders, were *Model Curriculum Standards, Grades K-8; Technology in the Curriculum Resource Guides*; *Subject Matter Project Documents*; and *Project 2061, Science for all Americans. Science Framework for California Public Schools, 1990*, was the Curriculum Framework used.

Science 2000 is a multimedia product designed for use by teachers using a constructivist, cooperative learning model in a one-year science curriculum. It can be used to stimulate and increase students' attention and interest, to expand instruction beyond what can normally be provided with textbooks, to actually replace textbooks and to support teachers.

B. Staff Development

While a teacher needs no prior experience with computers or software in order to use the program, training is necessary, and one or two days' time would be needed in order to become proficient. A videotape providing an overview of the program, and a teacher's guide providing all necessary instructional information, are available.

The company provides staff development for the schools independently and in collaboration with education agencies. Product demonstration sites will be available to teachers at up to forty pilot schools in California and at IBM staff development sites. Schools will be able to pay for a brief staff development orientation session from the company. In addition, dealers are providing staff development.

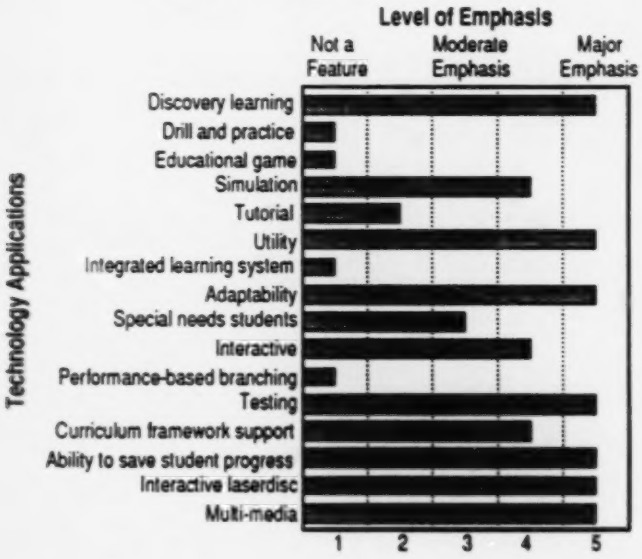
C. Documentation

Besides the teacher guide and the overview videotape, one year of 7th grade teachers' science lesson plans and support materials such as student investigations, software activities, two double-sided laserdiscs and four kits are available.

D. Product Features

Figure 2 shows the level of emphasis given to the product's various features.

Figure 2: Features of Product



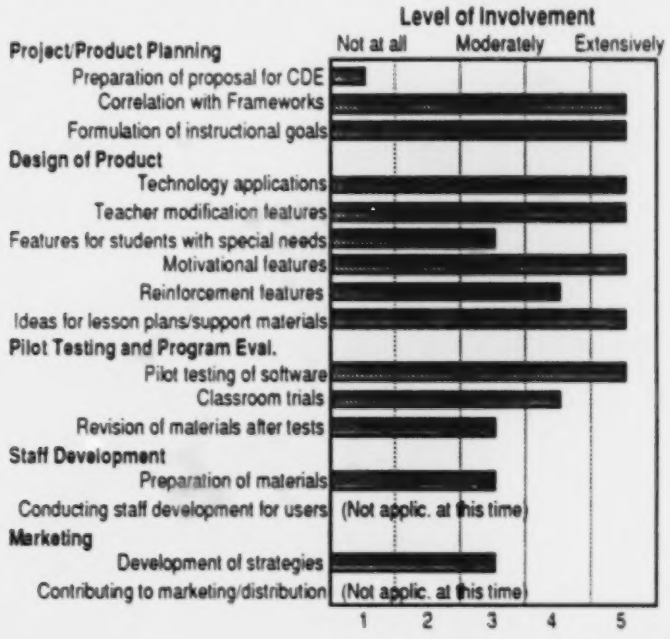
The most important features of the product were discovery learning, which provides opportunities for students to problem solve and explore; utility, which uses software as a tool for editing text, worksheets and spreadsheets; adaptability, which allows teacher modification; Curriculum Framework support; interactive laserdisc; multimedia components including software, laserdiscs, kits, video and text; student assessment items on or offline; teacher tool for curriculum/lesson planning; and modification capabilities for report preparation by students or teachers. Simulation and interactive capabilities are also very important.

This software requires the use of a Macintosh or IBM PC compatible computer, and a Pioneer LDV 2200 or 4200 laserdisc player. While no other software packages are required, graphics, reference, telecommunications, and networking software are suggested.

V. Product Development

As shown in Figure 3, teachers were involved extensively in most phases of product development.

Figure 3: Involvement of Teachers in Product Development



Thirteen of the seventeen consultants involved in the development and testing of *Science 2000* were teachers divided almost equally between content designers and content reviewers. The remaining four consultants served as writers. Collaborative activities of the project developers and the CDE's Office of Educational Technology consisted of bimonthly meetings.

VI. Evaluation Plan (Beta Testing)

Twenty-four seventh grade teachers in twelve school districts were consulted to determine teacher acceptance of *Science 2000* according to appropriateness of its content and the ease of use of its software, laserdiscs and kits. Fifteen hundred of the students were urban; 1500 of the students were suburban; and 200 of the students were rural. Pre-test and post-test models were used formatively and summatively including student and teacher surveys, journals and classroom observations. Decision Development Corporation bought some hardware components for some sites, although most schools had all the hardware needed.

VII Project Outcomes

The project was still in progress at the time of the self-assessment, so no outcomes or evaluation results are available at this time.

Science 2000 is expected to need updating for new information every two or three years.

VIII. User Survey Findings

A. General Information

Since *Science 2000* was still in development at the time of this survey, beta test sites had to be surveyed rather than regular users. Six surveys were returned by educators who are currently testing the program with their classes. All were teachers (including a department chair, a mentor teacher, and the director of TASC II, a Level II Academic-Technology Model Project). One third of the educators were at schools which had received AB 1470 School-Based Educational Technology Grants.

All respondents stated that *Science 2000* was used in teaching science in 6th or 7th grade. At TASC II, *Science 2000* was tested in the project's Knowledge Lab.

Two thirds of the respondents were aware that the development of *Science 2000* was funded in part by the CDE.

District media/technology specialists (50%) were the most commonly cited sources of initial information about *Science 2000*. Educators also learned about the product from a school principal, a school department head, articles in professional journals, the CDE, and a district curriculum coordinator.

Four respondents (67%) decided to test *Science 2000* with their classes because they enjoy using technology programs in class and were looking for ways to increase student interest in science. Also cited were fulfilling curriculum needs, students getting more out of instruction when technology is used, recommendations from colleagues, student enjoyment of technology programs, a principal or department head's desire to try the program, and a variety of other reasons.

B. Staff Development

All survey respondents reported prior computer use was necessary to use *Science 2000*. Two thirds stated they had received staff development in the use of the product. This training was conducted by school staff, district office staff, and Decision Development Corporation (DDC). Half of the educators who received staff development indicated it was adequate.

Those who reported the staff development as adequate described it as on-going consultation with DDC regarding specific software and curriculum issues, one-on-one instruction, and provision of equipment, cables, and disks.

When asked what staff development they thought was necessary to use *Science 2000* effectively, teachers suggested basic training in the use of the Macintosh or IBM computer and laserdisc system, a broad overview of the program's clusters and how they fit together, practice both with and without students, and classroom management and cooperative learning training.

To effectively integrate *Science 2000* with the curriculum, teachers reported general computer knowledge was essential, new classroom management techniques are needed (to rotate 30-35 students through one or two workstations), adequate preparation time must be provided, and a method for assessing student progress and assigning grades must be developed.

C. Curriculum Content and Technology Applications

A wide variety of physical and life science topics were listed by teachers as being covered in *Science 2000*, including: Ecology, Pesticides, Food Webs, Food Chains, Habitats, Topographic Maps, Geology, The Water Cycle, The Environment, Microbiology, The Solar System, and Photosynthesis. The beta versions of these units were all given fours and fives on a scale of one to five rating completeness of coverage. The average rating was 4.5.

Teachers recommended several pieces of additional equipment to be used with the program in addition to the required Macintosh or IBM compatible computer and laserdisc player. Recommendations included: video equipment, LCD projection panels (many Macintosh screens are too small for group instruction), CD-ROM drives, probes for experiments, and modems.

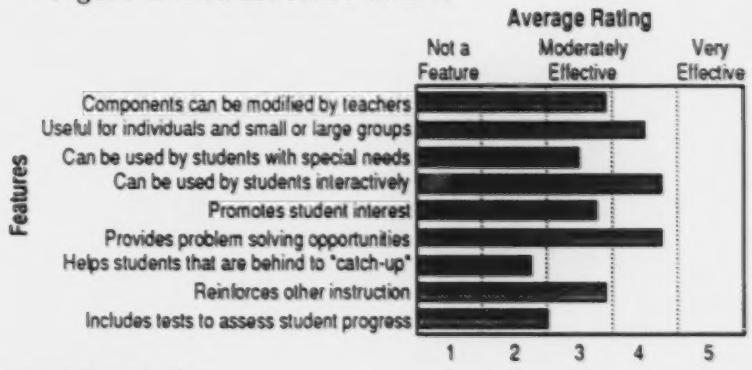
All but one of the six teachers surveyed have the computer and laserdisc player required to use *Science 2000* in their classrooms. Two have equipment at their schools that teachers can share. Two stated that their school could not afford the equipment needed to use the program (some equipment was loaned to teachers by DDC for beta-testing purposes. All six reported the required equipment is not easy for teachers to use.

Two teachers used CD-ROM databases with *Science 2000* and found them to be effective, two used telecommunications programs, and one used Logowriter and other Apple IIe software. HyperCard, graphics, and database software were also found to be effective when used in conjunction with *Science 2000*.

D. Instructional Features

As shown in the Figure 4, the most effective features of *Science 2000* were its ability to be used with groups of differing sizes, the problem solving opportunities it provides, and its interactivity. Weak areas in the beta version were that it didn't allow students that were behind to "catch-up" easily and that it did not provide an effective means to assess student progress.

Figure 4. Instructional Features



E. Software Product Evaluation

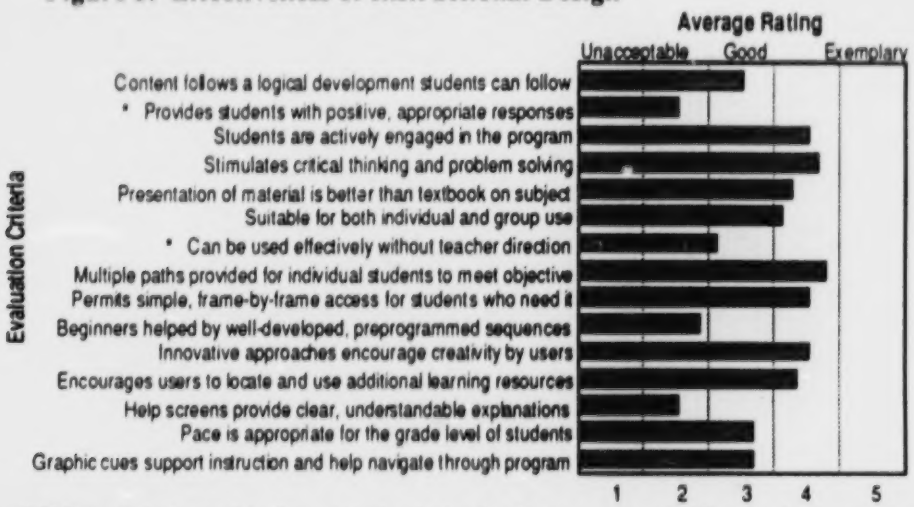
The teachers surveyed tested *Science 2000* in a variety of settings including large and small groups, individual student use, and teacher presentation. Because of the difficulty of rotating individual students through one workstation, only half of the teachers tried this approach.

Due to the fact that many features of the program were not operational in the beta version, most teachers tested less than half of the entire curriculum package.

Four respondents used *Science 2000* on a daily basis. One teacher used the program constantly, all period, for three weeks and another used it for two weeks. At five of the sites *Science 2000* was used by only one teacher. The remaining site stated that five teachers had tried the program in a variety of subject areas, including social science, language, math and science.

The following figures show the average ratings given to various evaluation criteria. The evaluation criteria were based on those used by the California Instructional Video and California Computer Software Clearinghouses.

Figure 5. Effectiveness of Instructional Design


Average Rating
Unacceptable
Good
Exemplary
Evaluation Criteria
Content follows a logical development students can follow
* Provides students with positive, appropriate responses
Students are actively engaged in the program
Stimulates critical thinking and problem solving
Presentation of material is better than textbook on subject
Suitable for both individual and group use
* Can be used effectively without teacher direction
Multiple paths provided for individual students to meet objective
Permits simple, frame-by-frame access for students who need it
Beginners helped by well-developed, preprogrammed sequences
Innovative approaches encourage creativity by users
Encourages users to locate and use additional learning resources
Help screens provide clear, understandable explanations
Pace is appropriate for the grade level of students
Graphic cues support instruction and help navigate through program
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* Science 2000 was designed to be a teacher's tool – it was not specifically designed to give 'right' answers to students.

Figure 6. Effectiveness of Interactive Features

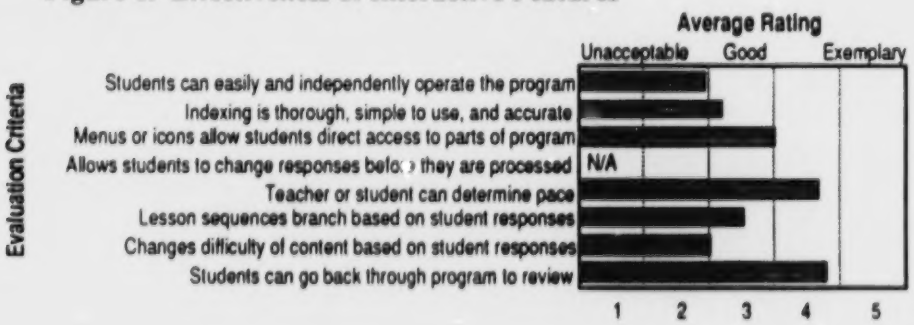
Average Rating
Unacceptable
Good
Exemplary
Evaluation Criteria
Students can easily and independently operate the program
Indexing is thorough, simple to use, and accurate
Menus or icons allow students direct access to parts of program
Allows students to change responses before they are processed
N/A
Teacher or student can determine pace
Lesson sequences branch based on student responses
Changes difficulty of content based on student responses
Students can go back through program to review
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Figure 7. Support of Curriculum Frameworks

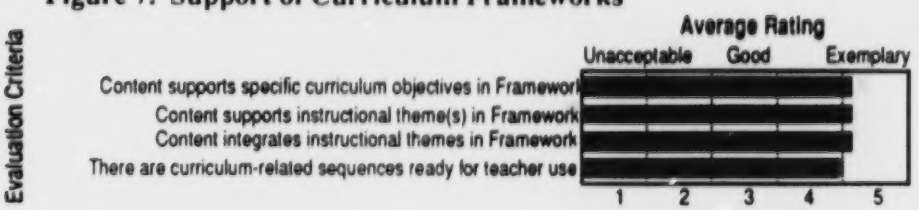
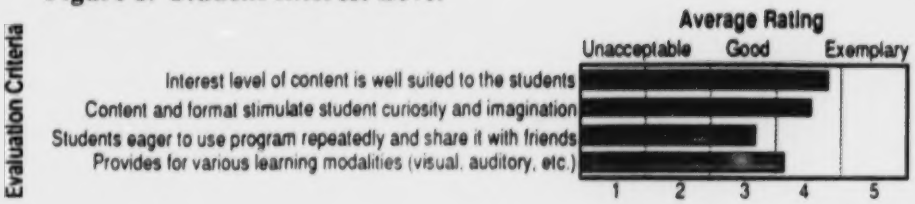


Figure 8. Student Interest Level



As shown in Figure 5, the most effective elements of Science 2000's instructional design were its stimulation of critical thinking and problem solving and its flexibility in allowing individual students to meet objectives in different ways. The most highly rated interactive features were that the program's pace can be set by the student or teacher and that students can go back through the program to review (see Figure 6). Science 2000's support of the California Curriculum Framework for science was found to be exemplary by almost all of the educators surveyed (see Figure 7). As shown in Figure 8, high ratings were also given to the program's ability to stimulate student interest in science. The average overall rating of the instructional value of *Science 2000* was 3.8 (between fair and good on a five point scale). Some teachers were hesitant to rate the program since they had not seen the final version.

Only one teacher was aware of any similar products. He listed Rediscover Science from Edunetics and programs from MECC and Jostens.

Since *Science 2000* was beta tested rather than purchased and the price and features of the final version had yet to be determined, no teachers were able to evaluate its cost effectiveness. The project list price is projected to be $5,000 per unit (including a site software license) with a 25 percent discount for California schools.

F. User Comments

The director of TASC II stated:

> *"Learning as I saw it happen could not have taken place without Science 2000."*

She went on to state that student participation and "turn-on" was wonderful while using the program.

Another teacher stated:

> *"the short video clips and and slides which we accessed through the laserdisc system provided excellent visuals for students."*

These teachers suggested that the software component of *Science 2000* would be more effective if at least four workstations were available in the classroom instead of just one.

IX. Funding and Support Factors

A. Funding Support

The CDE's Software Development Project Grant of $884,000 covered the majority of the development costs of this project. Partners in the project contributed in-kind support estimated

at $538,347. Besides Decision Development Corporation these partners included the National Geographic Society, Dinamation, Pacific Bell, the IBM Corporation, and Apple, Inc.

Both the funding and the intellectual support provided by the state were necessary for Decision Development Corporation to have attempted this project.

B. Project Expenditures

Since the project was not yet completed at the time of the self-assessment, no final budget information is available.

C. Supporting and Impeding Factors

Funding Factors. The overall funding available for this development project, the amount of funding provided by the CDE, and the schedule of payments all were believed to have greatly supported the planning, implementation and outcomes of this project.

Product Development Factors. Also of the highest importance were the interaction with the project advisory group, establishing working relationships with development partners, protecting intellectual property of publisher and partners, performance of development partners, and matching product content with California Curriculum Framework for marketing both within and without California.

Evaluation and Monitoring Factors. The factors most conducive to the development of *Science 2000* included establishing project review/evaluation procedures with the CDE, clarifying content objectives with the CDE project monitor, ongoing communication with the CDE project monitor, and making changes in the product design specifications suggested by the internal and external evaluations and by the CDE project monitor.

X. Marketing

The product will have a list price of $5,000 per unit (including a site software license), with a 25 percent discount to California schools.

California will receive a 10 percent royalty on all out of state sales of Science 2000.

XII. Use of Product by School-Based Grant Projects

No projects are currently using *Science 2000* as it was not yet on the market.

Jostens Explorations in Middle School Science: The Physical Science Program

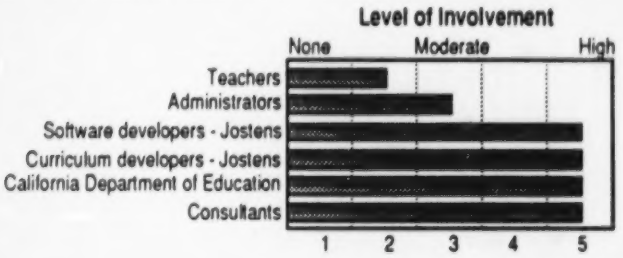
I. Background Information

Jostens Learning Corporation of San Diego, California submitted *Explorations in Middle School Science* as one of several software development partnership projects funded by the CDE and the Legislature between 1987 and 1990.

II. Planning

This project was initiated and planned by Jostens, the CDE, and a variety of educators and consultants. Figure 1 shows the level of involvement of various parties in the planning process. The primary planners were curriculum developers and software developers.

Figure 1: Level of Involvement of Various Parties in Planning Process



An advisory committee was established for this project which consisted of six science education consultants who developed the basic curriculum strands and the concepts in each strand.

The Jostens staff involved in this project consisted of a director, a head writer, a project manager, a technology coordinator, and two writers.

III. Project Plan

The project objectives were reported to have been accomplished and all activities were completed as planned. No major changes were made in the scope of work or timelines.

IV. Content

A. Curriculum Content

Science was the major curriculum area targeted by *Explorations*. In designing the software, which was intended to serve grades 6 through 9, several curriculum resources were consulted: *Model Curriculum Standards, Grades 9-12; Model Curriculum Standards, Grades K-8; Technology in the Curriculum Resource Guides, Subject Matter Project Documents*; and other state curriculum guides. *The California Science Framework, 1978* and the 1984 addendum, were the curriculum frameworks consulted.

The specific framework topics covered were: Matter, Mechanics, Energy Sources and Transformations, Heat, Light, Electricity and Magnetism, and Sound. All were covered completely except for Heat and Sound, which received moderate coverage.

Explorations lessons were designed to take up one class period each, but two periods usually are required. A total of 30 lessons are included in the program, requiring 30 to 60 class periods to complete. Potentially, this product could be used to stimulate and increase students' attention and interest, to expand instruction beyond what can normally be provided with textbooks, to introduce and/or conclude a lesson, to provide added activities to the existing lesson and to provide extended practice or related activities to the existing lesson. The program is appropriate for use by individual students or small groups of two to five students.

B. Staff Development

A teacher should be familiar with very basic computer operations in order to use this software, with proficiency in using the program requiring at least 40 hours of training by a specialist. Sixty hours of teacher training by a Jostens Educational Services Consultant are included in the purchase price of the software. In addition, demonstration sites are available in Sacramento, Los Angeles, and Irvine.

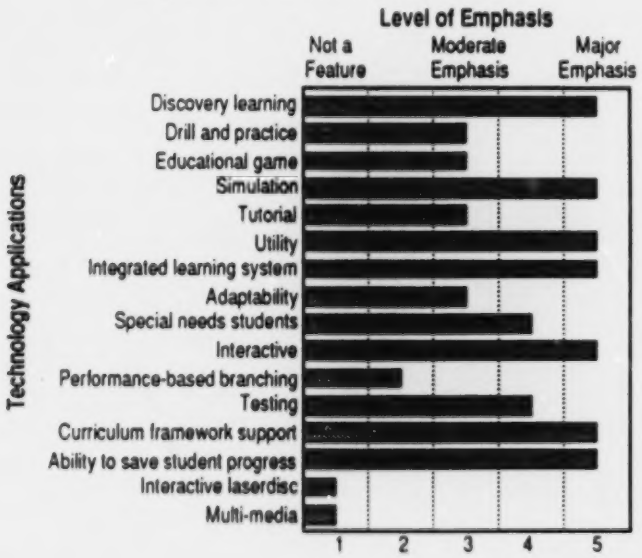
C. Documentation

A teacher's guide which includes lesson plans, technical documentation, and curriculum specific materials is provided with the program.

D. Product Features

Figure 2 below indicates the degree to which each of the features listed is emphasized in the product.

Figure 2: Features of Product



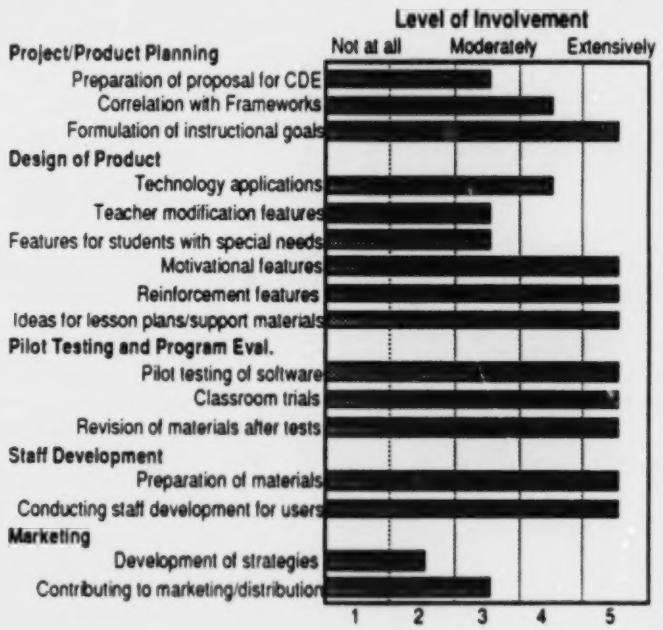
Following are some of the major features of the program:

- The program provides students with many opportunities to learn and explore on their own.
- All lessons are built around powerful simulations.
- An on-line notebook/writing processor and calculator are available for student use.
- The Jostens Integrated Learning System (ILS) which provides a networked environment capable of recording each student's progress is a part of the program.
- All lessons force the student to interact.
- All lessons are in-depth studies of concepts emphasized in the framework.
- An Apple IIGS, Macintosh or IBM compatible computer with a color monitor is required. In addition, network hardware is needed, including: a file server with a CD-ROM drive, network boards, and cables. IBM compatible computers require a voice board.
- Word processing and networking software is required; an electronic encyclopedia program is suggested.

V. Product Development

As shown in Figure 3, teachers were involved extensively in most phases of product development. All Jostens curriculum writers and staff developers are credentialed and experienced classroom teachers.

Figure 3: Involvement of Teachers in Product Development



The CDE collaborated with Jostens during the development process through meetings and review of unit and lesson design.

VI. Evaluation Plan (Beta Testing)

As part of its formative evaluation, *Explorations* was reviewed by 15 teachers who attended the August 1989 Summer Science Institute sponsored by UC Irvine. A networked Apple IIgs laboratory was established at UC Irvine through the assistance of Jostens staff and it was used in the evaluation of the program. The major formative evaluation questions were:

- Do the activities comply with the highest standards of excellence in educational software as defined in the Guidelines for Educational Software in California Schools?
- Are the activities at the appropriate level and interesting? Is the scientific content accurate? Are they motivating? Are they up-to-date?
- How do the activities work when students work individually? In pairs? In larger groups?
- Do the activities meet teachers' needs? Do they fit into the teacher's classroom?
- Do the on-line tests provide sufficient assessment of individual student progress? Do they address teachers' classroom management needs?
- Is the documentation satisfactory?
- What recommendations do the teachers have for improving the materials?

Teachers were asked to review several of the program's lessons and then fill out questionnaires and rating sheets based on these evaluation questions. The software was also reviewed for compliance with state requirements for instructional materials and assessed for consistency with the California Science Framework and Guidelines.

The summative evaluation consisted of five major components:

- A questionnaire was administered to teachers who were using the materials at the beta test sites.
- Telephone interviews were conducted with teachers and administrators at participating sites. Based on these interviews and on feedback from Jostens Education Specialists, one site was selected for a detailed case study.
- Site visits, with interviews of all involved staff, were made to each beta test site.
- Cognitive outcomes were measured using on-line quizzes and standardized achievement measures.
- The impact of the materials on students' attitudes towards science were assessed.

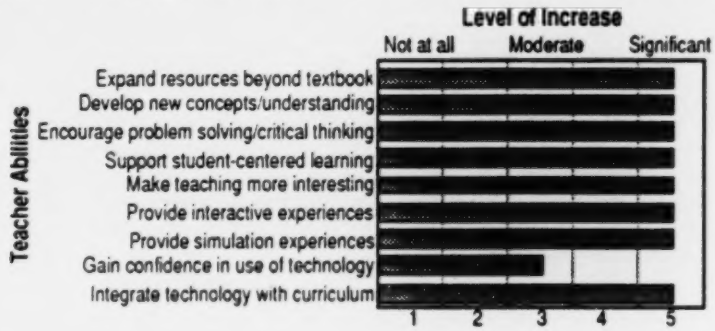
Among the quantitative instruments used in the evaluation were: proficiency tests, student and teacher surveys, records of computer use, and school climate surveys. Qualitative instruments included: portfolio assessments, student and teacher interviews, teacher assessment of student work, classroom observations, teacher journals, and incidental comments by students and staff.

The alpha and beta testing included 1,150 students at two junior high schools, one in Sacramento and one in Los Angeles. Many of the students were bilingual and a fair number were in special education or gifted programs. The field test sites were chosen based on student population and the availability of equipment. During alpha testing, an adult objective observer used each lesson with a small group of students as soon as it was developed. Both the student and the observer would fill out reports and these observations were incorporated into the program. The alpha testing led to many small but significant changes in the screen designs and the beta testing led to a shifting of resources to teacher training and the implementation of strategies and tools.

VII. Project Outcomes

Explorations allowed students to construct a conceptual understanding of ideas outside of their normal experiences, and it provided the opportunity to manipulate variables, measure responses, and draw conclusions easily. Teachers were free to be the facilitator of learning and not the lecturer and were allowed to delve into concepts beyond the understanding of the students (see Figure 4).

Figure 4: Increases in Teacher Abilities Brought About by *Explorations in Science*



There were no systematic efforts to determine the cost-benefits of the software development project in comparison with conventional school textbook development programs.
Among the unanticipated outcomes of the project was the discovery of a need for greater teacher training with a specific need for whole solutions (full curriculum) to make the greatest use of the computer.

Jostens releases at least one upgrade yearly with enhancements. Due to school demand, all lessons have been ported to the new Macintosh LC computer.

VIII. User Survey Results

A. General Information

Twenty-six surveys were sent to a variety of educators using a mailing list of users provided by Jostens. Six surveys (21%) were returned by educators who are currently using the program with their classes. All were science teachers including one who was a science department chair. None of the educators taught at schools which had received AB 1470 School-Based Educational Technology Grants.

All respondents stated that *Explorations* was used in teaching science in 7th and 8th grade.

One third of the respondents were aware that the development of *Explorations* was funded in part by the CDE.

School principals (67%) and sales representatives from Jostens (33%) were the most commonly cited sources of initial information about *Explorations*. Educators also learned about the product from a school library/media specialist and a fellow teacher.

Four teachers stated that the program was purchased by their district. The other two did not know who had made the purchasing decision.

Four respondents (67%) decided to try *Explorations* with their classes because it related to a curriculum need of their students. Also cited were student enjoyment of technology programs, looking for ways to increase student interest in science, a principal or department head's desire to try the program, information about the program making it look good, teacher preference for using technology programs in class, use of the program being requested by the district or department, and a variety of other reasons. One teacher stated that she was able to preview the program before using it.

B. Staff Development

None of the respondents reported that prior computer use was necessary to use *Explorations*. Two thirds stated they had received staff development in the use of the product. This training was conducted for the most part by Jostens, with some assistance from school and district staff. All of the educators who had received staff development indicated it was adequate.

The staff development was described as a brief introduction to the computer and the basic features of the program. Teachers were advised to practice with the program on their own. The built-in tutorial section made it easy for them to learn to use *Explorations* effectively with a minimum of outside support. One teacher stated: "The staff development was good for the small amount of time allowed."

When asked what staff development they thought was necessary to use *Explorations* effectively, two teachers suggested curriculum integration training, two suggested hands-on time with the program, and one stated the none was needed other than learning to use a mouse. One school used a networked system managed by a technology specialist which alleviated the need for teachers to know anything other than how to coach the students at each individual station.

To effectively integrate *Explorations* with the curriculum, teachers felt that information was needed on the specific curriculum content of each unit, and that time was needed for them to run through each lesson on the computer to see where it belongs in the curriculum.

C. Curriculum Content and Technology Applications

A variety of physical science topics were listed by teachers as being covered in *Explorations*, including: Electricity, Energy, Mechanics, and Light and Sound. These units were all given fours or fives on a scale of one to five rating completeness of coverage. The average rating was 4.4. One teacher was disappointed that no earth science topics were included in the program.

Only one of the six teachers surveyed had the IBM compatible computer required to use *Explorations* in their classroom. The others have equipment at their schools that teachers can share. One stated that their school could not afford the equipment needed to use the program. Four respondents felt that the required equipment is easy for teachers to use and one stated that the equipment is cumbersome and difficult for most teachers to use.

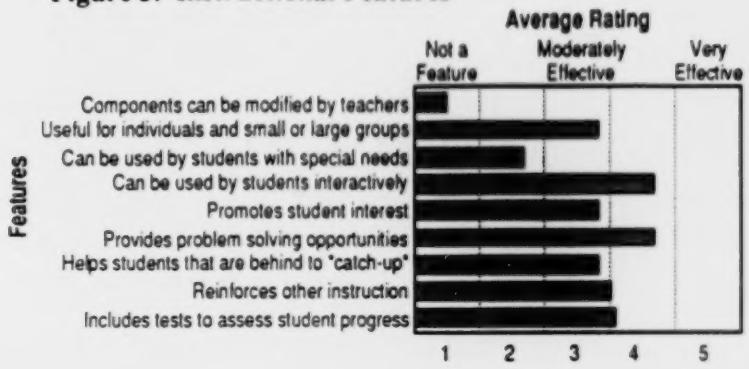
Word processing and Integrated Learning Systems programs were used effectively in conjunction with *Explorations* by three of the teachers. One of these teachers also used graphics software.

D. Instructional Features

As shown in Figure 5, the most effective features of *Explorations* were its ability to be used by students interactively, its stimulation of student problem solving, and its ability to assess student

progress. Components of the program can not be modified by teachers and it was not found to be very effective for students with special needs.

Figure 5. Instructional Features



E. Software Product Evaluation

All of the teachers surveyed used *Explorations* with individual students. In addition, one teacher used it with large groups and another used it with small groups.

Most teachers have used less than half of the entire curriculum package.

Five respondents use *Explorations* once per week, and one uses it twice per month. The number of teachers using the program at each site ranged from two to 26. In addition to science, the program is used in math, English-language arts, and history-social science.

The following figures show the average ratings given to various evaluation criteria. The evaluation criteria were based on those used by the California Instructional Video and California Computer Software Clearinghouses.

Figure 6. Effectiveness of Instructional Design

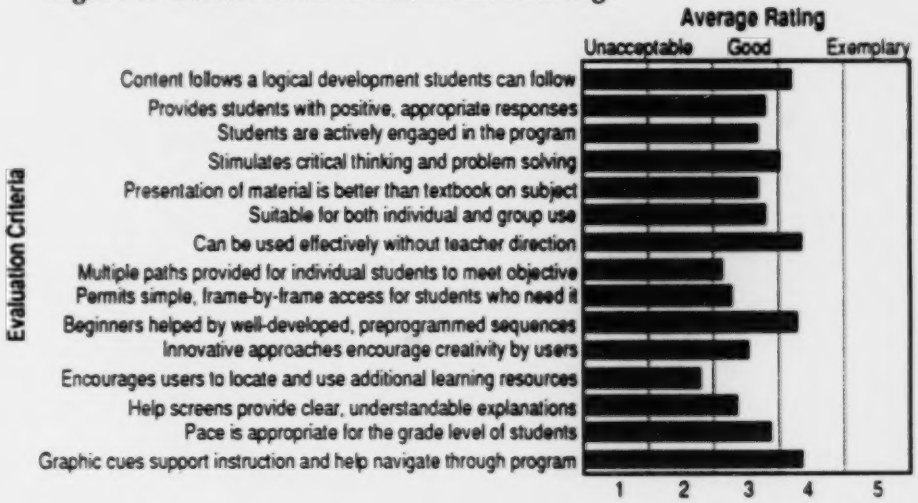

Average Rating
Unacceptable
Good
Exemplary
Evaluation Criteria
Content follows a logical development students can follow
Provides students with positive, appropriate responses
Students are actively engaged in the program
Stimulates critical thinking and problem solving
Presentation of material is better than textbook on subject
Suitable for both individual and group use
Can be used effectively without teacher direction
Multiple paths provided for individual students to meet objective
Permits simple, frame-by-frame access for students who need it
Beginners helped by well-developed, preprogrammed sequences
Innovative approaches encourage creativity by users
Encourages users to locate and use additional learning resources
Help screens provide clear, understandable explanations
Pace is appropriate for the grade level of students
Graphic cues support instruction and help navigate through program
1
2
3
4
5

Figure 7. Effectiveness of Interactive Features

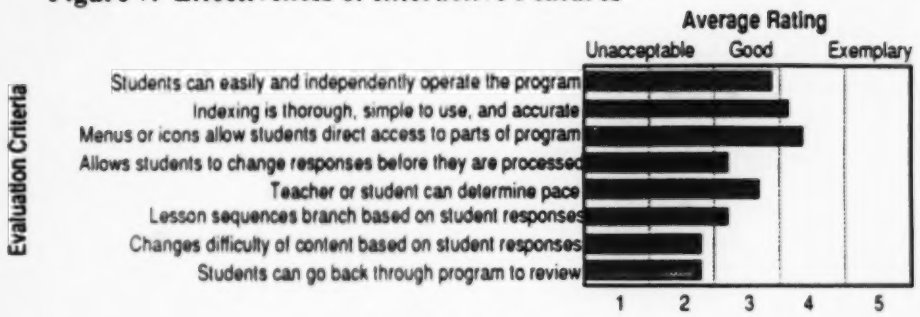

Average Rating
Unacceptable
Good
Exemplary
Evaluation Criteria
Students can easily and independently operate the program
Indexing is thorough, simple to use, and accurate
Menus or icons allow students direct access to parts of program
Allows students to change responses before they are processed
Teacher or student can determine pace
Lesson sequences branch based on student responses
Changes difficulty of content based on student responses
Students can go back through program to review
1
2
3
4
5

Figure 8. Support of Curriculum Frameworks

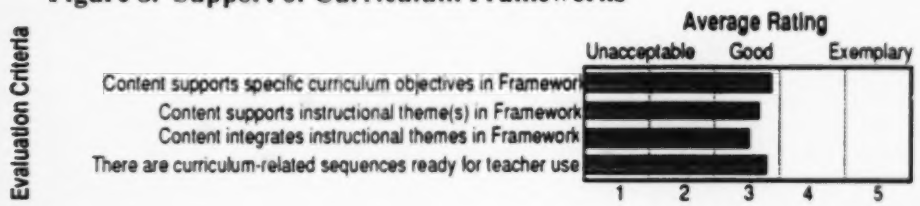
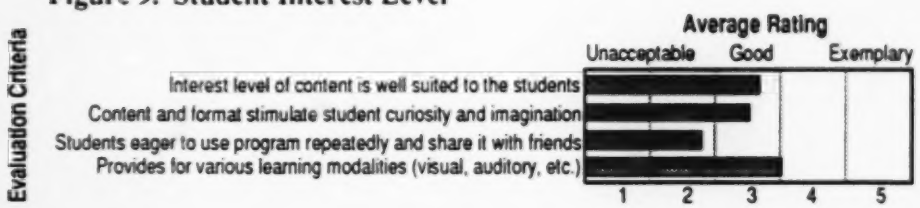


Figure 9. Student Interest Level



As shown in Figure 6, the most effective elements of Explorations' instructional design were its ability to be used without teacher direction, its logical sequence of instruction, and its graphics cues which help students navigate through the program. The most highly rated interactive features were the menus and icons which guide students through the program and its simple and accurate indexing system (see Figure 7). Explorations' support of the California Science Framework was found to be good by almost all of the educators surveyed (see Figure 8). As shown in Figure 9, fairly good ratings were also given to the program's ability to stimulate student interest in science. The average overall rating of the instructional value of *Explorations* was 4.2 (between good and superior on a five point scale).

IX. Funding and Support Factors

A. Funding Support

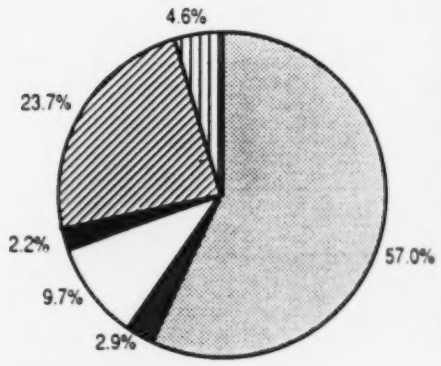
UC Irvine contributed significant evaluation support to the project and UCLA and McDonnell Douglas provided moderate support in developing lesson content.

Jostens contributed $332,000 to the development of *Explorations*. It would not have been possible for Jostens to have developed and produced this product without the $167,500 CDE Software Development Project Grant. At the present rate of sales, Jostens will need three more years before it recovers its initial investment. The company stated that to support a new product development, they would need to sell enough to make $20 for every dollar invested.

B. Project Expenditures

The total expenditures for Jostens *Explorations in Science* were $500,000. All costs of the project were covered by the amounts invested by Jostens and the CDE. Figure 10 gives a breakdown of the expenses of project development, as reported in the Self-Assessment Inventory.

Figure 10: Project Expenditures



Expenditure	Amount
Professional staff	$160,000
Support staff	$10,000
Materials/supplies	$9,000
Contract services/ expenses	$45,000
Staff Benefits	$30,000
Technology hardware	$45,000
Total	$290,100

C. Supporting and Impeding Factors

Funding Factors. The amount of funding provided by the CDE grant greatly supported the planning, implementation and outcomes of the project. The schedule of CDE grant fund payments and the overall level of funding were also helpful.

Product Development Factors. The factors which most supported product development were: interaction with the project advisory group, establishment of a working relation with the development partners, and protection of the intellectual property of the publisher and partners. The performance of the partners also facilitated development. The most severe impediments to development were the limitations of hardware in schools and the matching of product technology applications to teacher skills.

Evaluation and Monitoring Factors. The factors which most supported evaluation and revision on the product were the assessment of teacher capabilities to use the program effectively and evaluation of the effects of the product on student learning and attitudes.

X. Marketing

Jostens sales representatives market *Explorations* directly to the schools. There are no sales through dealers or distributors.

Explorations in Science costs approximately $6,000 per individual station. This amount includes a computer, laserdisc player, and software. Quantity discounts are available: the cost for five stations is $20,000; for ten stations, $27,500. California schools receive a discount of 20 percent off catalog price.

To date, the state has received $51,500 from the 10 percent royalty on out of state sales.

There are 16 *Explorations in Science* labs currently operating in California with approximately 32 stations per lab. An additional 84 labs exist in schools outside of California. Sales have been much less than predicted in the grant proposal.

XI. Use of Product by School-Based Grant Projects

No AB 1470 School-Based Educational Technology Grant Projects reported using *Explorations in Science*. Most School-Based Grants were not large enough to purchase such expensive software and the networked computer systems required to use it.

Summary of Evaluation Findings

I. Background Information

Seven software development partnership projects were funded by the CDE between 1987 and 1990. Self-Assessment Inventories were returned by four completed projects (*Explorations in Science, GTV, MECC World GeoGraph*, and *Science 2000*) and one cancelled project (*C&C Exploring Matter*). Surveys were returned by users of *GTV, World GeoGraph*, beta-test versions of *Science 2000*, and *Explorations in Science*.

II. Planning

The projects were all initiated by the CDE in collaboration with the software developers partners. CDE involvement in the planning of the projects was varied – *Science 2000* and *Explorations in Science* reported extensive involvement, and the other three projects that completed inventories reported only moderate involvement. Teachers were involved in the planning of all projects except *Science 2000*. In general, school administrators had little involvement in project planning. All of the projects except *Exploring Matter* had active advisory committees, established either by the developers, or in the case of *Science 2000*, by the CDE. Educators and variety of other individuals, ranging from corporate advisors to psychologists, served on these committees.

III. Project Plan

The four complete projects stated that, with few modifications, the originally planned activities had been completed.

IV. Content

A. Curriculum Content

Two of the completed projects targeted science; the other two, history-social science. These areas were seen by the state as lacking in quality software and were considered unprofitable by the developers. All of the projects based the curricular content of their programs on the CDE's California Curriculum Frameworks, *Model Curriculum Standards*, and Technology *in the Curriculum Resource Guides*.

The products were designed to be used with students in a variety of ways to enrich the curriculum and increase interest and motivation. *GTV* and *Science 2000* are interactive multimedia products, consisting of computer software and laserdiscs, which can be used for teacher presentation or interactively by individual students or small groups. *MECC World GeoGraph* is a discovery learning computer program which can be used by students to freely explore topics of their choice or as a teacher presentation aid. *Explorations in Science* can be used by individuals or small groups for discovery learning and performing simulated experiments and is part of the Jostens Integrated Learning System.

B. Staff Development

Most of the products were designed to be user friendly and to require a minimum of technical support. A basic knowledge of computer operation was suggested as a prerequisite for operating each of the programs. The time required for a teacher to become proficient in operating the

programs ranged from one or two hours for *World GeoGraph* to several days for *Explorations in Science*, which is the most complex of the programs, requiring a file server networked with several learning stations. Jostens includes 60 hours of training in the purchase price of *Explorations in Science*.

C. Documentation

All products provide instructions for operating the software and extensive curriculum integration information. An entire year's worth of seventh grade science lesson plans and support materials are provided with *Science 2000*, which is comprehensive enough to replace conventional textbooks as the primary source of instruction.

D. Product Features

All of the products can be used for discovery learning; all are highly interactive, all can be used as utilities for student research or projects; all are highly adaptable to different instructional situations, including special needs students; and all except for the uncompleted *Exploring Matter* closely support the state curriculum frameworks. *Science 2000* and *Explorations in Science* have assessment components. *GTV* and *Explorations in Science* have the ability to save student progress.

V. Product Development

Classroom teachers were heavily involved in the planning, development, and testing of all of the products. The CDE and a variety of consultants also assisted in product development. Collaborative activities with the CDE included: meetings, evaluation of content and software quality, marketing to California schools, staff development planning and implementation, and monitoring of project progress. C & C was the only developer reporting dissatisfaction with the level of support and collaboration obtained from the CDE.

VI. Evaluation Plan (Beta Testing)

All of the software development projects tested their products extensively in real-life classroom situations. Hundreds of teachers and thousands of students were consulted in the testing process, using both surveys and classroom observations. Student and teacher suggestions were used in making changes and adjustments to the products before their final release.

VII. Project Outcomes

Information on project outcomes was only available on *GTV*, *Explorations in Science* and *World GeoGraph*. These three programs were both reported to significantly increase teacher abilities to expand resources beyond those available in the textbook, and to make teaching more interesting. Other areas of strong positive impact on teachers were improvements in integrating technology with the curriculum and encouraging of problem solving and critical thinking.

Student outcomes reported for *GTV* included: traditional material presented in a vivid new form, access to a huge database of images, a chance to practice reading and writing with the context of "making" television, and video specifically designed for a media-saturated audience. With *World GeoGraph* students learned to use a database as a tool for inquiry and analysis, observe patterns of similarities and differences among nations, observe possible correlations among various types of data, and understand basic geographic concepts of location, place, relationships within places, movement, and regions. *Explorations in Science* helped students to understand

ideas outside of their normal experience and to easily observe the results of changing variables in experiments.

VIII. User Survey Results

A. General Information

A total of 33 surveys were returned by users (mostly classroom teachers) of *GTV, MECC World GeoGraph, Jostens Explorations in Middle School Science*, and *Science 2000*. A little over half of the respondents were aware that the development of these programs was funded in part by the CDE. The most commonly cited sources of initial information about these programs were advertisements and catalogs, fellow teachers, sales representatives from vendors, and school principals. Over two-thirds of the educators surveyed decided to try the program with their class because it related to a curriculum need of their students. Other common reasons were looking for ways to increase student interest, teacher enjoyment of using technology programs in class, and student liking the use of technology.

B. Staff Development

Over half of the teachers reported prior computer use was necessary to use the software products effectively and about half had received staff development in the use of the products. Software publishers were the most commonly cited source of training. Fifty-eight percent of those who had received staff development felt that it was adequate.

C. Curriculum Content and Technology Applications

With few exceptions, teachers stated the curriculum areas targeted by these products were covered adequately. Less than half of the teachers have the equipment necessary to use the products in their classroom. More often, equipment was available in the school for them to share, often making it difficult to provide students with individual, interactive access to the programs. A few stated that their school could not afford the required equipment. Less than half of those surveyed felt the equipment was easy for most teachers to use.

D. Instructional Features

In general, users felt that the instructional features of the programs were effective. The only major weaknesses seen were that programs (especially *Explorations in Science*) could not be effectively modified by teachers for different needs, and that tests were not included to assess student progress (The final version of *Science 2000* allows modification by teachers and includes testing).

E. Software Product Evaluation

The programs were used most often as teacher presentation tools and by individual students. Extensive use was also reported in large and small group settings. Two-thirds of the teachers surveyed had used less than half of the entire curriculum package supplied and 30 percent used more than half but less than 80 percent. One teacher used the entire package. Forty-six percent of the teachers used the program on a monthly basis, 39 percent on a weekly basis, and 15 percent on a daily basis.

Due to differences in design approach there was a great deal of variation in scores for specific evaluation criteria between the different programs except that all but *Explorations in Science* scored high on curriculum framework support and student interest level. In general, the

programs were rated highly for overall instructional value (average of 4.3 on a scale from one to five).

A third of the educators surveyed were aware of other products similar to state-supported product they were using.

There was no real consensus as to whether the software products or conventional textbook instruction is more cost effective. The majority of educators stated that they did not know.

IX. Funding and Support Factors

A. Funding Support

All of the projects stated that development would not have been undertaken without support from the state. All of the developers, except for DDC, the developer of *Science 2000*, contributed funding of their own far in excess of the amount provided by the state. The National Geographic Society and other organizations whose support it solicited made the biggest contribution in funding; they spent $1.2 million in addition to the $500,000 contributed by the state while developing *GTV*. In all, over $2.4 million was invested by the developers in exchange for an investment of $1.8 million by the CDE.

B. Project Expenditures

Detailed breakdowns of expenditures were provided for three of the products, *World GeoGraph*, *Explorations in Science* and *Exploring Matter*. With these three, and probably with the others as well, the biggest expense was for professional staff involved in designing, developing, and marketing the programs.

C. Supporting and Impeding Factors

The factors that most supported project implementation were: the amount of funding provided by the CDE, overall funding for the projects, field testing of the software, and the results of the projects' (internal) evaluation of their products. The factor that most consistently impeded implementation was the limited hardware available at schools.

X. Marketing

Marketing information was supplied by MECC, National Geographic, and Jostens. *World GeoGraph* and *GTV* are marketed through catalogs, brochures, conference exhibits, advertisements, and other means. Both have exceeded sales expectations and have passed the break-even point on development costs. *Explorations in Science* is marketed directly by Jostens sales representatives. Jostens has not recovered its investment and sales have been much lower than predicted.

XI. Use of Products by School-Based Grant Projects

GTV is listed by 14 percent of the projects surveyed, and *World GeoGraph* is used by a few projects. No projects stated that they used *Explorations in Science* and *Science 2000* was not available at the time the projects were surveyed. Both *GTV* and *World GeoGraph* were rated as being highly effective in supporting the instructional goals of the projects they were used in.

XII. Recommendations

- School-Based Grant applicants and other schools need to be made more aware of the availability of state-developed software which matches the frameworks.
- *Science 2000* and *Explorations in Science* and the additional hardware and software products required to use them effectively are expensive. The state needs to consider how to provide more access to state-of-the-art instructional materials for schools which have limited budgets.
- A more uniform evaluation process for software development projects should be incorporated which includes guidelines for performance-based assessments of student outcomes resulting from the programs.
- Establish a procedure for tracking the programs after production and distribution to assess their use and impact on teaching and learning.
- Assess the extent to which software development projects increase teacher implementation of the California Curriculum Frameworks and student understanding of Framework topics.
- Continue to evaluate the impact and cost-benefits of development projects such as *Science 2000*.

Appendix A:

Software Development Project Assessment Instruments

- Survey Letter
- Developer Survey Cover Letter
- Self-Assessment Inventory
- Software User Survey

Far West
LABORATORY

SAMPLE

May 6, 1991

From: John Cradler and Beth Fisher

To: Science 2000 Beta Test Teachers

Subject: **Evaluation of Science 2000**

Your name was provided to us an educator who is field testing Science 2000. Because of your experience with this program, you are being requested to fill out the enclosed survey. The information will be used by the California Educational Technology Assessment Project (CETAP).

CETAP is conducted by the Far West Laboratory to determine the impact of programs and projects funded by AB 1470, the Educational Technology Act. The findings of this survey are very important to this assessment project and will be used by the California Department of Education and the California State Legislature to determine future funding for educational technology.

Your prompt attention to completing and returning this survey will be appreciated. Please return to John Cradler at the address provided below by JUNE 14, 1991.

If there are any questions please feel free to call John Cradler at (415) 565-3018 or Beth Fisher at (415) 494-2030

Far West Laboratory For Educational Research and Development
730 Harrison Street San Francisco, CA 94107-1242 (415) 565-3000 FAX (415) 565-3012

Far West Laboratory For Educational Research and Development
730 Harrison Street
San Francisco, CA 94107-1242
(415) 565-3018 FAX (415) 565-3012

SAMPLE

_____, 199_

Dear _____:

As we discussed on the phone, we are in the process of evaluating AB 1470 and its many programs. The objective of the evaluation is to obtain information that will help us improve future state funded programs, and guide us in the development of state policy and educational technology programs. .

The evaluation process includes is to have the software developers and users complete an evaluation survey. We will then conduct phone interviews with each developer and a small sample of users. We will also have a software evaluation team review each product in light of the original project objectives.

As a participant in the Software Development Partnership Program, we ask that you and your team complete the enclosed evaluation form and return it before _____.

As I mentioned, we would appreciate your assistance in contacting 30-50 users of your product. We will be sending each user a survey and a cover letter explaining the purpose of the survey. In addition, if you already have user information that would be helpful with our research, we would appreciate you sharing that with us.

Please feel free to call me at _____ if you have any questions or comments on this project. We look forward to talking with you in the coming weeks. Thank you again for your time and assistance.

Sincerely,

_____

SOFTWARE DEVELOPMENT PARTNERSHIP PROJECT
SELF-ASSESSMENT INVENTORY

Far West Laboratory for Educational Research and Development **December 1991**

The purpose of this inventory is to provide the California Department of Education (CDE) and the Legislature with information about the outcomes of the software development partnership projects funded between 1987 and 1990.

The inventory is designed to follow CDE guidelines for the *California Educational Technology Assessment Project* (CETAP) being conducted by the Far West Laboratory. It should be completed by the person who had primary responsibility for developing the software product, with input from others who had key roles in the design and production of the products.

Please compete the survey by _____ and return it to _____ at the address below. If any questions or problems arise while completing the inventory please contact _____.

SECTION I: Background Information

Name of Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Final Product Title: _____

Person(s) completing this form: _____

Telephone: _____

Name of Project Director: _____ Phone:_____

Other person(s) who may be contacted: _____ Phone:_____

SECTION II: Planning

1. Indicate who initiated the project concept and design (circle Y or N) and the level of involvement of each in project planning (circle the appropriate number):

	Initiated?	Level of Involvement (None … Moderate … High)
a. Teachers	Y N	1 2 3 4 5
b. Administrators	Y N	1 2 3 4 5
c. Software developers	Y N	1 2 3 4 5
d. Curriculum developers	Y N	1 2 3 4 5
e. California Department of Education	Y N	1 2 3 4 5
f. Consultants	Y N	1 2 3 4 5
g. Other (specify):_____	Y N	1 2 3 4 5
h. Other:_____	Y N	1 2 3 4 5

2. Was a planning or advisory committee established for the project? (circle one)
   Yes 1
   No 2

If yes, give the names and affiliations of the members and the major activities of the committee:

3. Identify the key individuals who were involved in developing the project:

Name	Title	Organization Represented

SECTION III: Project Plan

1. To what extent were the project objectives and activities accomplished? (circle one)

Completed as planned 1
Partially completed 2
Modified but completed 3
Modified and partially completed 4

2. If numbers 2, 3 or 4 were answered please explain why. State the project objectives, noting if there were any changes from the original objectives:

Describe:

3. Describe major changes in the scope of work, timelines, etc., that were negotiated before the project was completed.

Describe:

SECTION IV: Content

A. Curriculum Content

1. Indicate the curriculum areas that were targeted:

(circle all that apply)

Mathematics 1
Science 2
History-Social Science 3
English-Language Arts 4
Other (specify):_____ 5

2. Indicate the grade levels the program was designed to serve (circle all that apply):

Pre-K K 1 2 3 4 5 6 7 8 9 10 11 12 Adult

3. Identify the curriculum resources that were consulted in conceptualizing and designing the software:

(circle all that apply)

California Curriculum Frameworks 1
Model Curriculum Standards, Grades 9-12 2
Model Curriculum Standards, Grades K-8 3
Technology in the Curriculum Resource Guides 4
Subject Matter Project Documents 5
State adopted curriculum materials 6
Other (specify) _____ 7

4. Give the title(s) and publication date(s) of the California Curriculum Framework(s) that were consulted during the development of the program:

Title	Date

5. List the specific California Curriculum Framework topics that were incorporated into the design of the software product, and circle the number that indicates the extent to which each topic was emphasized in the finished product.

Topic	Level of Emphasis in Final Product Not at all		Moderately		Completely
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5

6. What is the suggested length of instructional time for teachers to use this product?

Describe how the product was designed to be used. Include the length of time recommended for each student session (in minutes) and the number of sessions needed to complete the program for the average student. If a different length or number of sessions is recommended for different grade levels, please specify.

7. List the potential uses of the product: (circle all that apply)

To stimulate and increase students' attention and interest 1
To expand instruction beyond what can normally be provided with textbooks 2
To use to introduce and/or conclude a lesson 3
To provide added activities to the existing lesson 4
To provide extended practice or related activity to the existing lesson 5
To replace the textbook 6
Other (specify):_____ 7

8. Is this program appropriate for: (circle all that apply)

Individual student use 1
Small group use (2-5 students) 2
Whole class use 3
Other (specify):_____ 4

B. Staff Development

1. Describe any support materials for students and/or teachers that are available for use with the product:

Describe:

2. Teacher experience needed to use program: (circle all that apply)

No prior experience with computers or software needed 1
Must be familiar with basic computer operations 2
Specific training required (specify):_____ 3

3. How much time would be needed for a teacher to become proficient in using the product?_____

4. Is a specialist needed to provide product training? _____ yes _____ no

5. Are product demonstration sites available to teachers? _____ yes _____ no

   If yes, where are they located?

6. Does the company provide staff development for the school or district independently or in collaboration with education agencies such as county offices?

7. Are dealers providing staff development for your product?_____ yes _____ no

8. Is staff development support provided for purchasers of the product? (circle as many as apply)
   - Staff development support is not necessary for schools that purchase the product 1
   - The teacher's guide for the product provides all necessary instructional information 2
   - A self-administered staff development tutorial is built-in to the product 3
   - The publisher's sales representatives provide staff development 4
   - Schools can pay for a brief staff development orientation session from the company 5
   - Staff development costs are covered with purchase price of the product 6
   - A fairly intensive staff development workshop is available to schools for a fee 7
   - Other (fill-in) _____ 8

C. Documentation

1. What teaching tools are available for teachers?

2. What technical documentation is provided?

3. Are any curriculum specific materials provided?

D. Product Features

1. Circle the number that matches the degree to which each of the features listed below is emphasized in the product:

Not a feature or emphasis -------->		Moderately emphasized --------->		Major emphasis
1	2	3	4	5

Technology Applications	Level of Emphasis
a. **Discovery Learning** (Provides opportunities for students to problem solve and explore)	1 2 3 4 5
b. **Drill and Practice** (Promotes learning through repetitive practice)	1 2 3 4 5
c. **Educational Game** (Promotes learning through a game format)	1 2 3 4 5
d. **Simulation** (Simulates experiences generally unavailable, such as lab experiments, world travel, and historical events)	1 2 3 4 5
e. **Tutorial** (Provides direct instruction, provides practice, tests for mastery, etc.)	1 2 3 4 5
f. **Utility** (Use of software as tool, e.g., text editor, spreadsheet, worksheets, etc.)	1 2 3 4 5
g. **Integrated Learning System** (Networked computers for teaching from a common set of software)	1 2 3 4 5
h. **Adaptability** (Program can be modified by teacher)	1 2 3 4 5
i. **Special Needs** (Program can be used with special needs students)	1 2 3 4 5
j. **Interactive** (Students use program interactively)	1 2 3 4 5
k. **Performance-Based Branching** (Automatically adjusts level of difficulty according to student responses)	1 2 3 4 5
l. **Testing** (Program has built-in student diagnostic component	1 2 3 4 5
m. **Curriculum Framework Support** (Supports Ca. Curriculum Frameworks)	1 2 3 4 5
n. **Ability to Save Student Progress** (Program can record where students have left off for use in future sessions)	1 2 3 4 5
o. **Interactive Laserdisc** (Computer interfaced with videodisc)	1 2 3 4 5
p. **Multi-Media** (list components):_____	1 2 3 4 5
q. **Other** (describe):_____	1 2 3 4 5
s. **Other** (describe):_____	1 2 3 4 5
u. **Other** (describe):_____	1 2 3 4 5

2. For each of the features where a 4 or 5 was circled, describe how the program implements feature.

Describe:

SOFTWARE DEVELOPMENT PARTNERSHIP PROJECT
SELF-ASSESSMENT INVENTORY

Far West Laboratory for Educational Research and Development **December 1991**

The purpose of this inventory is to provide the California Department of Education (CDE) and the Legislature with information about the outcomes of the software development partnership projects funded between 1987 and 1990.

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Please compete the survey by _____ and return it to _____ at the address below. If any questions or problems arise while completing the inventory please contact _____.

SECTION I: Background Information

Name of Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Final Product Title: _____

Person(s) completing this form: _____

Telephone: _____

Name of Project Director: _____ Phone:_____

Other person(s) who may be contacted: _____ Phone:_____

SECTION II: Planning

1. Indicate who initiated the project concept and design (circle Y or N) and the level of involvement of each in project planning (circle the appropriate number):

	Initiated?	Level of Involvement (None … Moderate … High)
a. Teachers	Y N	1 2 3 4 5
b. Administrators	Y N	1 2 3 4 5
c. Software developers	Y N	1 2 3 4 5
d. Curriculum developers	Y N	1 2 3 4 5
e. California Department of Education	Y N	1 2 3 4 5
f. Consultants	Y N	1 2 3 4 5
g. Other (specify):_____	Y N	1 2 3 4 5
h. Other:_____	Y N	1 2 3 4 5

2. Was a planning or advisory committee established for the project? (circle one)
   Yes 1
   No 2

If yes, give the names and affiliations of the members and the major activities of the committee:

3. Identify the key individuals who were involved in developing the project:

Name	Title	Organization Represented

SECTION III: Project Plan

1. To what extent were the project objectives and activities accomplished? (circle one)

Completed as planned	1
Partially completed	2
Modified but completed	3
Modified and partially completed	4

2. If numbers 2, 3 or 4 were answered please explain why. State the project objectives, noting if there were any changes from the original objectives:

Describe:

3. Describe major changes in the scope of work, timelines, etc., that were negotiated before the project was completed.

Describe:

SECTION IV: Content

A. Curriculum Content

1. Indicate the curriculum areas that were targeted:

(circle all that apply)

Mathematics 1
Science 2
History-Social Science 3
English-Language Arts 4
Other (specify):_____ 5

2. Indicate the grade levels the program was designed to serve (circle all that apply):

Pre-K K 1 2 3 4 5 6 7 8 9 10 11 12 Adult

3. Identify the curriculum resources that were consulted in conceptualizing and designing the software:

(circle all that apply)

California Curriculum Frameworks 1
Model Curriculum Standards, Grades 9-12 2
Model Curriculum Standards, Grades K-8 3
Technology in the Curriculum Resource Guides 4
Subject Matter Project Documents 5
State adopted curriculum materials 6
Other (specify) _____ 7

4. Give the title(s) and publication date(s) of the California Curriculum Framework(s) that were consulted during the development of the program:

Title	Date

5. List the specific California Curriculum Framework topics that were incorporated into the design of the software product, and circle the number that indicates the extent to which each topic was emphasized in the finished product.

Topic	Level of Emphasis in Final Product Not at all		Moderately		Completely
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5

6. What is the suggested length of instructional time for teachers to use this product?

Describe how the product was designed to be used. Include the length of time recommended for each student session (in minutes) and the number of sessions needed to complete the program for the average student. If a different length or number of sessions is recommended for different grade levels, please specify.

7. List the potential uses of the product: (circle all that apply)

To stimulate and increase students' attention and interest 1
To expand instruction beyond what can normally be provided with textbooks 2
To use to introduce and/or conclude a lesson 3
To provide added activities to the existing lesson 4
To provide extended practice or related activity to the existing lesson 5
To replace the textbook 6
Other (specify):_____ 7

8. Is this program appropriate for: (circle all that apply)

Individual student use 1
Small group use (2-5 students) 2
Whole class use 3
Other (specify):_____ 4

B. Staff Development

1. Describe any support materials for students and/or teachers that are available for use with the product:

Describe:

2. Teacher experience needed to use program: (circle all that apply)

No prior experience with computers or software needed 1
Must be familiar with basic computer operations 2
Specific training required (specify):_____ 3

3. How much time would be needed for a teacher to become proficient in using the product?_____

4. Is a specialist needed to provide product training? _____ yes _____ no

5. Are product demonstration sites available to teachers? _____ yes _____ no

If yes, where are they located?

6. Does the company provide staff development for the school or district independently or in collaboration with education agencies such as county offices?

7. Are dealers providing staff development for your product?_____ yes _____ no

8. Is staff development support provided for purchasers of the product? (circle as many as apply)
   - Staff development support is not necessary for schools that purchase the product 1
   - The teacher's guide for the product provides all necessary instructional information 2
   - A self-administered staff development tutorial is built-in to the product 3
   - The publisher's sales representatives provide staff development 4
   - Schools can pay for a brief staff development orientation session from the company 5
   - Staff development costs are covered with purchase price of the product 6
   - A fairly intensive staff development workshop is available to schools for a fee 7
   - Other (fill-in) _____ 8

C. Documentation

1. What teaching tools are available for teachers?

2. What technical documentation is provided?

3. Are any curriculum specific materials provided?

D. Product Features

1. Circle the number that matches the degree to which each of the features listed below is emphasized in the product:

Not a feature or emphasis -------->	Moderately emphasized --------->	Major emphasis
1 2	3 4	5

Technology Applications	Level of Emphasis
a. **Discovery Learning** (Provides opportunities for students to problem solve and explore)	1 2 3 4 5
b. **Drill and Practice** (Promotes learning through repetitive practice)	1 2 3 4 5
c. **Educational Game** (Promotes learning through a game format)	1 2 3 4 5
d. **Simulation** (Simulates experiences generally unavailable, such as lab experiments, world travel, and historical events)	1 2 3 4 5
e. **Tutorial** (Provides direct instruction, provides practice, tests for mastery, etc.)	1 2 3 4 5
f. **Utility** (Use of software as tool, e.g., text editor, spreadsheet, worksheets, etc.)	1 2 3 4 5
g. **Integrated Learning System** (Networked computers for teaching from a common set of software)	1 2 3 4 5
h. **Adaptability** (Program can be modified by teacher)	1 2 3 4 5
i. **Special Needs** (Program can be used with special needs students)	1 2 3 4 5
j. **Interactive** (Students use program interactively)	1 2 3 4 5
k. **Performance-Based Branching** (Automatically adjusts level of difficulty according to student responses)	1 2 3 4 5
l. **Testing** (Program has built-in student diagnostic component	1 2 3 4 5
m. **Curriculum Framework Support** (Supports Ca. Curriculum Frameworks)	1 2 3 4 5
n. **Ability to Save Student Progress** (Program can record where students have left off for use in future sessions)	1 2 3 4 5
o. **Interactive Laserdisc** (Computer interfaced with videodisc)	1 2 3 4 5
p. **Multi-Media** (list components):_____	1 2 3 4 5
q. **Other** (describe):_____	1 2 3 4 5
s. **Other** (describe):_____	1 2 3 4 5
u. **Other** (describe):_____	1 2 3 4 5

2. For each of the features where a 4 or 5 was circled, describe how the program implements feature.

Describe:

3. Identify the type(s) of hardware used with the product (circle **R** if required, **S** if suggested, or **N** if not needed):

   a. Computers (systems supported): _____ ... R S N
   b. Laserdisc player ... R S N
   c. Audio/video equipment (specify): _____ ... R S N
   d. LCD panels, video projectors ... R S N
   e. CD-ROM drive ... R S N
   f. Science lab equipment (probes, data acquisition interfaces, etc.) ... R S N
   g. Color Monitor (specify type): _____ ... R S N
   h. Other (describe): _____ ... R S N
   i. _____ ... R S N
   j. _____ ... R S N

4. Identify the type(s) of other software packages which can accompany the product (circle **R** if required, **S** if suggested, or **N** if not needed).

   a. Word processing ... R S N
   b. Desktop publishing ... R S N
   c. Hypercard (text-based programming language) ... R S N
   d. Graphics programs ... R S N
   e. Electronic encyclopedia, reference ... R S N
   f. Database, spreadsheet, other business software ... R S N
   g. Telecommunications software ... R S N
   h. Networking software ... R S N
   i. Other (describe): _____ ... R S N
   j. _____ ... R S N
   k. _____ ... R S N

SECTION V: Product Development

1. To what extent were teachers involved in the development of the program?
   (circle the number that indicates the extent to which classroom teachers were involved in each task)

Not at all ----------> Moderately ----------> Extensively				
1	2	3	4	5

Project/Product Planning

a. Preparation of project proposal for CDE 1 2 3 4 5
b. Correlation of content with Curriculum Framework, etc. 1 2 3 4 5
c. Formulation of instructional goals and objectives for program 1 2 3 4 5

Design of Product (Content, Features, etc.)

d. Strategies for using technology applications in lessons 1 2 3 4 5
e. Ways that teacher is able to modify the program 1 2 3 4 5
f. Applications for students with special needs 1 2 3 4 5
g. Motivational or interest-enhancing features 1 2 3 4 5
h. Reinforcement features (how program reinforces other learning) 1 2 3 4 5
i. Preparation of lesson plans and teacher support materials 1 2 3 4 5

Pilot Testing and Program Evaluation

j. Pilot-testing of units or lessons 1 2 3 4 5
k. Conducting classroom trials of entire program for evaluation 1 2 3 4 5
l. Revision of classroom materials after pilot tests and evaluation 1 2 3 4 5

Staff Development

m. Preparation of staff development and product documentation materials ... 1 2 3 4 5
n. Conducting staff development programs for adopters of product 1 2 3 4 5

Marketing

o. Development of product marketing strategies 1 2 3 4 5
p. Contributing to marketing and distribution of product 1 2 3 4 5

2. Complete the table below as follows:

   - List the names and organizations of all outside consultants who were involved with the development and testing of the software product.
   - Briefly describe the product development phases or components in which they were involved.

Consultants	Organization	Product Development Phase/Component

4. Describe the collaborative activities of the project developers and the CDE Office of Educational Technology.

Describe:

SECTION VI: Evaluation Plan (Beta Testing)

1. Briefly summarize the evaluation plan.
   Number of districts involved ..... _____
   Number of teachers involved ..... _____
   Number of classrooms used ..... _____

List the evaluation questions or purpose:
Describe the procedure used for both formative and summative evaluation:

2. What data sources were used in the evaluation? (circle as many as apply):

Quantitative

Standardized achievement test (e.g., CTBS) 1
Proficiency tests/criterion referenced tests 2
Portfolio assessment (with scoring rubric) 3
Student surveys 4
Student attendance 5
Teacher surveys 6
Records of computer use (logs) 7
School climate surveys 8
Other (describe):_____ 9
Other:_____ 10

Qualitative

Portfolio assessment (adapted to the project) 1
Student interviews 2
Case studies 3
Student journals 4
Teacher assessment of student work 5
Classroom observations 6
Teacher interviews 7
Workshop evaluation 8
Teacher journals 9
Changes in school plans 10
Incidental comments by students/staff 11
Other (describe):_____ 12
Other:_____ 13

3. Describe in detail the final classroom field testing of the program. Include who tested the program, where it was tested, and how many teachers and students were involved.

   a. School/District(s): _____

   b. School Contact Person(s): _____

   c. Student participants (indicate the number for each grade):

   Pre-K_____ K_____ 1_____ 2_____ 3_____ 4_____ 5_____

   6_____ 7_____ 8_____ 9_____ 10_____ 11_____ 12_____

   Adult_____

   (fill-in the number of students for each type):

   Bilingual_____ Special Ed._____ Gifted_____

   Urban_____ Suburban_____ Rural_____

4. Were reports of the evaluation prepared? (circle one)

   Yes 1
   No 2

If yes, summarize findings: **Please attach copies of pilot-test and evaluation reports.**

Describe the procedures used, what the findings were, and what changes were made as a result of the field test:

Describe the process/criteria used for the selection of field test sites:

5. Indicate the availability of hardware for conducting the evaluation test (circle one):

Teacher(s) had all necessary hardware in their classroom(s)..... 1
School had all necessary hardware for teachers to share 2
Development project gave all necessary hardware to the school(s) 3
Project loaned all necessary hardware to the school(s)..... 4
Other (describe); _____ ... 5

6. Please attach copies of any published reviews of the product which have appeared in *The Computing Teacher*, *Electronic Learning*, or any other magazine. Also include a copy of the any evaluations from the California Software Clearinghouse or any other state agencies.

SECTION VII: Project Outcomes

1. Please describe specific benefits of the project for:

Students:
Teachers:
School Programs:

2. For each of the following categories, rate the observed impact of the program on teachers using the software product developed by the project (circle one number for each item below or circle n/a if the item does not relate to your project):

To what extent did the project INCREASE teacher ability to:	Level of Increase: Not at all		Moderate		Significant	
a. Expand use of resources beyond the textbook	1	2	3	4	5	n/a
b. Develop concepts/understanding not otherwise possible to teach	1	2	3	4	5	n/a
c. Encourage problem-solving and critical thinking	1	2	3	4	5	n/a
d. Support student-centered learning	1	2	3	4	5	n/a
e. Make teaching more interesting	1	2	3	4	5	n/a
g. Provide interactive experiences for students	1	2	3	4	5	n/a
h. Provide simulation experiences	1	2	3	4	5	n/a
i. Gain confidence in their own use of technology	1	2	3	4	5	n/a
j. Integrate technology into the curriculum	1	2	3	4	5	n/a
l. Other (describe):_____	1	2	3	4	5	n/a
m. Other: _____	1	2	3	4	5	n/a

3. Were there systematic efforts to determine the cost-benefits of the software development project in comparison with conventional school textbook development programs? (circle one)

Yes 1
No 2

If yes, briefly describe how the comparisons were made and what the findings were.

4. Were there any unanticipated outcomes of the project? (circle one)

Yes 1
No 2

If yes, briefly describe any outcomes of project implementation, product development, evaluation, revision, publication, etc., that were not anticipated. Include information on how the outcomes were identified and assessed, how they affected product development, and how problems were resolved.

5. How often will the software product have to be revised or updated? (circle one)

Every year 1
Every two or three years 2
Every four or five years 3
Every California Curriculum Framework cycle 4

Describe your plans for updating the program:

SECTION VIII. Funding and Support Factors

1. What support services or resources were received from formal and informal partnerships in developing the software product? (complete the matrix below as follows)

   - List any software developers, institutions of higher education, foundations, or educational agencies that provided formal or informal support in the development of your software product.
   - Briefly describe the resource or service provided (e.g., technical assistance, curriculum consulting, programming, linking of resources, etc.)
   - Circle the letter that indicates if the type of service or resource involved direct payment (**D**) or if it was contributed or provided in-kind (**I**).
   - Indicate the importance of the resource or service to the success of the overall project by circling the appropriate number as follows:

Not Important --------> Moderately Important --------> Very Important				
1	2	3	4	5

Organization/Agency	Resource/Service	Type	Importance
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5
		D I	1 2 3 4 5

2. Enter the sources and amounts of financial support for the software development project.

Source of Funding	Amount Received
CDE Software Development Project Grant	$
Your Organization	
Partners in Project (Fill-in)	
Other (Fill-in)	
Totals	$

3. Have your company and project partners recovered the investments in the project? (circle one)
   Yes 1
   No 2

If no, summarize the return on your investment to date and estimate when and if you expect to make a profit.

4. What is the minimum level of sales that it would take for your company to develop and produce the software product without state support?

Describe:

5. How much was actually spent on the software development project? Enter the sources and the amounts expended for each category.

Project Expenses

(Round to the Nearest $)

	Explanation of Expenditure	State Grant	Company Funding
1000 Professional Staff Salaries	Project Director FTE =_____		
	Professional Staff FTE=_____		
	Other:		
	Subtotal for 1000 Series	$	$
2000 Classified/Support Staff Salaries	Clerical Support FTE=_____		
	Other:		
	Subtotal for 2000 Series	$	$
3000	Staff Benefits:	$	$
4000 Materials/Supplies			
	Subtotal for 4000 Series	$	$

(Round to the Nearest $)

		Explanation of Expenditure	State Grant	Company Funding
5000 Contract Services/Expenses	Services	Consultants		
		Duplication/Packaging		
	Expenses	Facilities		
		Travel		
		Subtotal for 5000 Series	$	$
	Indirect Costs: Indirect costs are not a required item and can only be entered when a rate has been established. Indirect costs computations exclude the 6000 category. Rate_____%			
6000 Capital Outlay	Equipment	Computers		
		Other:		
		Subtotal for 6000 Series	$	$
		TOTALS	$	$
			GRAND TOTAL	

6. Did the CDE grant and the amount(s) invested by your company and project partners cover all of the costs of developing the product? (circle one)

Yes 1
No 2

If no, describe how the scope of the project was changed and/or how the shortfall was made up.

9. Supporting and Impeding Factors. Indicate the extent to which each of the following factors affected planning, implementation, and the outcomes of the project (circle N/A if not applicable or one number for each item in the list below):

	Greatly Impeded ←			No Effect			→ Greatly Supported	
Funding Factors								
Amount of funding provided by CDE grant	N/A	-1	-2	-1	0	+1	+2	+3
Overall funding available for development project	N/A	-1	-2	-1	0	+1	+2	+3
Schedule of CDE grant fund payments	N/A	-1	-2	-1	0	+1	+2	+3
Product Development Factors								
Interaction with project advisory group/panel	N/A	-1	-2	-1	0	+1	+2	+3
Establishing working relationships with development partners	N/A	-1	-2	-1	0	+1	+2	+3
Protecting intellectual property of publisher and partners	N/A	-1	-2	-1	0	+1	+2	+3
Performance of development partners	N/A	-1	-2	-1	0	+1	+2	+3
Matching product content with California Curriculum Framework:								
• For marketing product within California	N/A	-1	-2	-1	0	+1	+2	+3
• For marketing the product outside of California	N/A	-1	-2	-1	0	+1	+2	+3
Correlating product with curriculum in other states	N/A	-1	-2	-1	0	+1	+2	+3
Considerations for marketing product outside of California	N/A	-1	-2	-1	0	+1	+2	+3
Limitations of hardware in schools	N/A	-1	-2	-1	0	+1	+2	+3
Matching product technology applications to teachers' skills	N/A	-1	-2	-1	0	+1	+2	+3
Developing staff development materials for product users	N/A	-1	-2	-1	0	+1	+2	+3
Evaluation and Monitoring Factors								
Establishing project review/evaluation procedures with CDE	N/A	-1	-2	-1	0	+1	+2	+3
Clarifying content objectives with CDE project monitor	N/A	-1	-2	-1	0	+1	+2	+3
Field testing software	N/A	-1	-2	-1	0	+1	+2	+3
Ongoing interaction/communication with CDE project monitor	N/A	-1	-2	-1	0	+1	+2	+3
Getting final approval of product from CDE	N/A	-1	-2	-1	0	+1	+2	+3
Assessing capabilities of teachers to use the programs effectively	N/A	-1	-2	-1	0	+1	+2	+3
Evaluating effects of product on student learning and attitudes	N/A	-1	-2	-1	0	+1	+2	+3
Making changes in product design specifications necessitated by:								
• Results of project (internal) evaluation	N/A	-1	-2	-1	0	+1	+2	+3
• Recommendations of external evaluation	N/A	-1	-2	-1	0	+1	+2	+3
• CDE project monitor	N/A	-1	-2	-1	0	+1	+2	+3

SECTION IX. Marketing

1. How is the software product being marketed?

Describe how the product is being marketed (a) within California and, if different, (b) outside of the state; include information on the sales organization(s), distributor(s), advertising and other promotional efforts, etc. **(Attach brochure describing product if available)**

2. How much does the product cost?

Provide cost breakdowns for different quantities sold to (a) California schools and (b) outside the state.

3. Are sales of the software product meeting the expectations of the developers?

Describe briefly how well the product is selling (a) in California and (b) outside of the state; include data on projected and actual sales in both markets and how they compare with competitive products, if any exist.

SECTION X. Recommendations

Review all information gathered with this inventory (as well as all other available information relevant to the project) and use the space below to make one or more recommendations regarding the future of the project:

SOFTWARE DEVELOPMENT PARTNERSHIP PROGRAM
SOFTWARE USERS SURVEY

Far West Laboratory for Educational Research and Development **April 1991**

The purpose of this survey is to provide the California Department of Education (CDE) with information about the products of four software development partnership projects funded between 1987 and 1990. The survey follows CDE guidelines for the *California Educational Technology Assessment Project* (CETAP) being conducted by the Far West Laboratory.

The form should be completed by each person in a school who has implemented one or more of these software products in classroom instruction. A separate form should be completed for each product implemented. (Please duplicate additional copies as needed)

Please compete the survey(s) and return not later than June 14, 1991 to the Far West Laboratory at the address below. If any questions or problems arise while completing the questionnaire please contact John Cradler, FWL Program Director for Educational Technology and Policy:

John Cradler	**Phone: (415) 565-3018**
Far West Laboratory	**FAX: (415) 565-3012**
730 Harrison Street	**AppleLink: K1686**
San Francisco, CA 94107-1242	**CSUNet: jcradle**

A. Background Information

1. School: _____ District: _____

   Address: _____

   City: _____ Zip: _____ County: _____

2. Person completing this form: _____ Title: _____

   Telephone: _____ Date: ____/____/____

   Technology Grant Recipient? Yes_____ No_____

3. Software Product Used (circle one number):
   MECC World Geograph 1
   Jostens Explorations in Middle School Science: The Physical Science Program 2
   GTV: A Geographic Perspective on American History 3
   SCIENCE 2000 (field test version) 4

4. Course/Subject of product application? (fill-in) _____

5. Estimate the number of students using the product in each grade level:

	K	1	2	3	4	5	6	7	8	9	10	11	12	Adult
# of Students														

6. Were you aware that the California Department of Education partially supported development of this software product? (circle one)
   Yes 1
   No 2

7. How did you learn about the software program? (circle all that apply)

Advertisement/catalog from software producer/vendor 1
Sales representative of software producer/vendor 2
School principal 3
School department head 4
School librarian/media/technology specialist 5
Teacher colleague at school 6
Teacher acquaintance from another school 7
Listing in technology newsletter (such as CUE) 8
Article in professional journal or newsletter 9
District curriculum coordinator/specialist 10
District media/technology specialist 11
County office curriculum consultant 12
County office media/technology consultant 13
California Technology Project Regional Consortium representative 14
Leadership Academy Demo 15
California Department of Education 16
At professional conference 17
TRIE (Technology Resources in Education) database on CSUNet 18

Other (fill-in) _____ 19

8. Who bought the software? (fill-in) _____

9. Why did you decide to try the software in your class? (circle all that apply)

The program relates to a curriculum need of my class or classes 1
My students get more out of instruction when they use technology programs 2
I heard that the software program helped students understand the content/concept 3
My colleagues and I want to improve instruction dealing with the topic 4
I like using technology programs in my classes 5
My students like using technology programs in class 6
My principal or department head wanted me to try out the program 7
The information about the program made it sound very good 8
I am looking for ways to increase student interest in the topic 9
It was highly recommended by the person who told me about it 10

I was requested to do so by an administrator 11

Other (fill-in) _____ 12

B. Staff Development

1. In your opinion, is prior computer use necessary to use this product? (circle one)
Yes 1
No 2

2. Have you received any staff development in the use of the software product? (circle one)
Yes 1
No 2

If yes, indicate the source of the staff development (circle all that apply):

School staff (mentor teacher, media/technology specialist, etc.) 1
District office staff (media/technology coordinator, etc.) 2
County Office of Education staff 3
California Technology Project regional consortium staff 4

The publisher or distributor of the software product 5

Other (fill-in) _____ 6

Was the staff development adequate? (circle one)

Yes 1

No 2

If yes, describe the staff development:

If no, briefly explain why staff development was not adequate:

3. What staff development is necessary to use the product effectively?

Describe:

4. What training do you think is essential for a teacher to effectively integrate the product into the instructional program?

Describe:

C. Curriculum Content and Technology Applications

1. How adequately does the program cover the targeted subject matter? (circle one) ..... Not at all 1 2 3 4 5 Completely

2. What is the availability of the equipment needed to run the product? (circle **Y** for yes and **N** for no)

   a. I have all the equipment needed in my classroom ..... Y N
   b. My school has the equipment needed for teachers to share ..... Y N
   c. My school cannot afford the equipment needed ..... Y N
   d. The equipment is easy for most teachers to use ..... Y N
   e. The equipment is cumbersome and difficult for most teachers to use ..... Y N

D. Instructional Features .

1. How effective are the special instructional features?

   For each of the features that is incorporated in the product, circle the number that matches your rating of its *effectiveness* in promoting student learning (leave blank if the feature is not part of the product):

Features	Not a Feature	Moderately Effective			A Very Effective Feature
a. **Adaptability** (Can any components be modified by teachers?)	1	2	3	4	5
b. **Flexibility** (Can the product be used by individuals, small or large groups?)	1	2	3	4	5
c. **Special Needs** (Can it be used by students with special needs?)	1	2	3	4	5
d. **Interactivity** (Can students use the product interactively?)	1	2	3	4	5
e. **Motivational Features** (Does the product promote student interest?)	1	2	3	4	5
f. **Student Problem Solving** (Does it provide problem solving opportunities?)	1	2	3	4	5
g. **Remediation Capability** (Does the product help students "catch-up"?)	1	2	3	4	5
h. **Reinforcement** (Does it reinforce other instruction?)	1	2	3	4	5
i. **Testing** (Does it include tests or diagnostic/prescriptive component?)	1	2	3	4	5
Other Features (Describe and rate other special features of the product)					
j. _____	1	2	3	4	5
k. _____	1	2	3	4	5

E. Software Product Evaluation

1. How is the product used? (circle all that apply)
   - Teacher Presentation tool 1
   - By students in a large group setting 2
   - By students in a small group setting 3
   - By individual students 4

2. How much of the product have you used? (Circle one)
   - Less than half of the entire curriculum package 1
   - More than half but less than 80 percent of the entire curriculum package 2
   - Almost all of the curriculum package 3
   - The entire curriculum package 4
   - The entire curriculum package more than once 5
   - The entire curriculum package more than once with different classes 6

3. How many times is the product used in your classroom:

per day_____ per week_____ per month_____

4. How many teachers in your school use the product in your school? _____

> **Note**: The remaining items in this section are adapted from the guidelines for evaluating various types of educational technology programs prepared for the CDE by the California Instructional Video Clearinghouse and the California Computer Software Clearinghouse; *Guidelines for Computer Software in California Schools* and the *Guidelines for Computer-Interactive Videodisc in California Schools*.

5. How effective is the instructional design of the software product? Circle the number that matches your rating of how well the program accomplishes each of the criterion statements:

Unacceptable It does not work with my students 1	**Acceptable** It works but it's nothing special 2	**Good** It works quite well 3	**Desirable** It does more than expected 4	**Exemplary** It does all it's supposed to do and then some 5

a. Content follows a logical development that students can follow ..... 1 2 3 4 5 n/a
b. Program provides students with positive, appropriate responses ..... 1 2 3 4 5 n/a
c. Students are actively engaged in the program ..... 1 2 3 4 5 n/a
d. Program stimulates critical thinking and problem solving ..... 1 2 3 4 5 n/a
e. Presentation of concepts and ideas is better than textbook on subject ..... 1 2 3 4 5 n/a
f. Program is suitable for both individual and group use ..... 1 2 3 4 5 n/a
g. Students can use program effectively without extensive teacher direction ..... 1 2 3 4 5 n/a
h. Multiple paths are provided for individual students to meet objectives ..... 1 2 3 4 5 n/a
i. Program permits simple, frame-by-frame access for students who need it ..... 1 2 3 4 5 n/a
j. Beginning users are helped by well-developed, pre-programmed sequences ... 1 2 3 4 5 n/a
k. Innovative approaches encourage creativity by users ..... 1 2 3 4 5 n/a
l. Program encourages users to locate and use additional learning resources ..... 1 2 3 4 5 n/a
m. Help screens provide clear, understandable explanations ..... 1 2 3 4 5 n/a
n. Pace of the program is appropriate for the grade level of students ..... 1 2 3 4 5 n/a
o. Graphic cues support instructional goals and help navigate through program .. 1 2 3 4 5 n/a

6. How effective are the "interactivity" features of the program? Circle the number that matches your rating of how well students are able to interact with the program -- individually and in groups:

Unacceptable	Acceptable	Good	Desirable	Exemplary
It does not work with my students	It works but it's nothing special	It works quite well	It does more than expected	It does all it's supposed to and then some
1	2	3	4	5

a. Students can easily and independently operate the program ..... 1 2 3 4 5 n/a
b. Indexing is thorough, simple to use, and accurate ..... 1 2 3 4 5 n/a
c. Menus or icons allow students direct access to specific parts of program ... 1 2 3 4 5 n/a
d. Program allows students to alter responses before they are processed ..... 1 2 3 4 5 n/a
e. The teacher or the student can determine the pace through the program ..... 1 2 3 4 5 n/a
f. Lesson sequences are programmed to branch based on student responses... 1 2 3 4 5 n/a
g. Program presents harder or easier content according to student responses .. 1 2 3 4 5 n/a
h. Students can go back through the program to review ..... 1 2 3 4 5 n/a

7. How well does the software product match the curriculum? Circle the number that matches your rating of how well the program supports the California Curriculum Frameworks according to the following scale:

Unacceptable	Acceptable	Good	Desirable	Exemplary
1	2	3	4	5

a. Program content supports specific curriculum objectives in Framework ..... 1 2 3 4 5 n/a
b. Content supports one or more instructional themes in Framework ..... 1 2 3 4 5 n/a
c. Program content integrates instructional themes specified in Framework ... 1 2 3 4 5 n/a
d. There are curriculum-related sequences ready for teacher use ..... 1 2 3 4 5 n/a

8. How interesting is the software to students? Circle the number that matches your rating of how interesting your students find the program:

Unacceptable	Acceptable	Good	Desirable	Exemplary
It does not work with my students	It works but it's nothing special	It works quite well	It does more than expected	It does all it's supposed to and then some
1	2	3	4	5

a. The interest level of the program content is well suited to the students ..... 1 2 3 4 5 n/a
b. Program content and format stimulate student curiosity and imagination.... 1 2 3 4 5 n/a
c. Students are eager to use the program repeatedly and share it with friends . 1 2 3 4 5 n/a
d. Program provides for various learning modalities (visual, auditory, etc.).... 1 2 3 4 5 n/a

9. How do you rate the overall instructional value of the software product? (circle one)

Very poor; I would not recommend it to other teachers 1
Poor; I would be quite hesitant to recommend it to other teachers 2
Fair; I would recommend it with some reservation to other teachers 3
Good; I would recommend it to other teachers 4
Superior; I would recommend it to very highly to other teachers 5

10. Are you aware of similar products? (circle one)

Yes	1
No	2

If yes, please name (give publisher, title, and price):

11. How cost-effective is the software product? That is, was the money spent on this software a worthwhile investment? Compare what your students have learned when using the software product with the learning of similar groups of students using conventional print materials, such as textbooks. (circle one)

I really don't know if there is any difference	1
Conventional print materials are much more cost effective	2
Conventional print materials are a little more cost effective	3
Print materials and the software product are about equally cost effective	4
The software product is a little more cost effective	5
The software product is much more cost effective	6

12. What price did your (school, district) pay for this product? $_____

13. Whas the program worth what was paid? (circle one):

Yes	1
No	2